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NINETY-NINTH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY

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CONTENTS INDEX PAGE 5

THE IRON AGE

PRODUCTION -:- MANAGEMENT MARCH 8, 1934 PROCESSES -:- NEWS

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Contents

No Time to Rock the Boat	7
Mercury-Vapor-Steam Plant Fusion Welded	8
Long Term Outlook in Iron and Steel	12
Soviet Standardizes Blast Furnace Design	20
The Significance of Equilibrium Diagrams	25
Making of Knee-Action Springs	25C
New Equipment	26
News	28
Personals and Obituaries	30
Washington News	31
February Pig Iron Output	31C
Automotive Industry	31D
Markets	33
Construction and Equipment Buying	50
Products Advertised	68
Index to Advertisers	86

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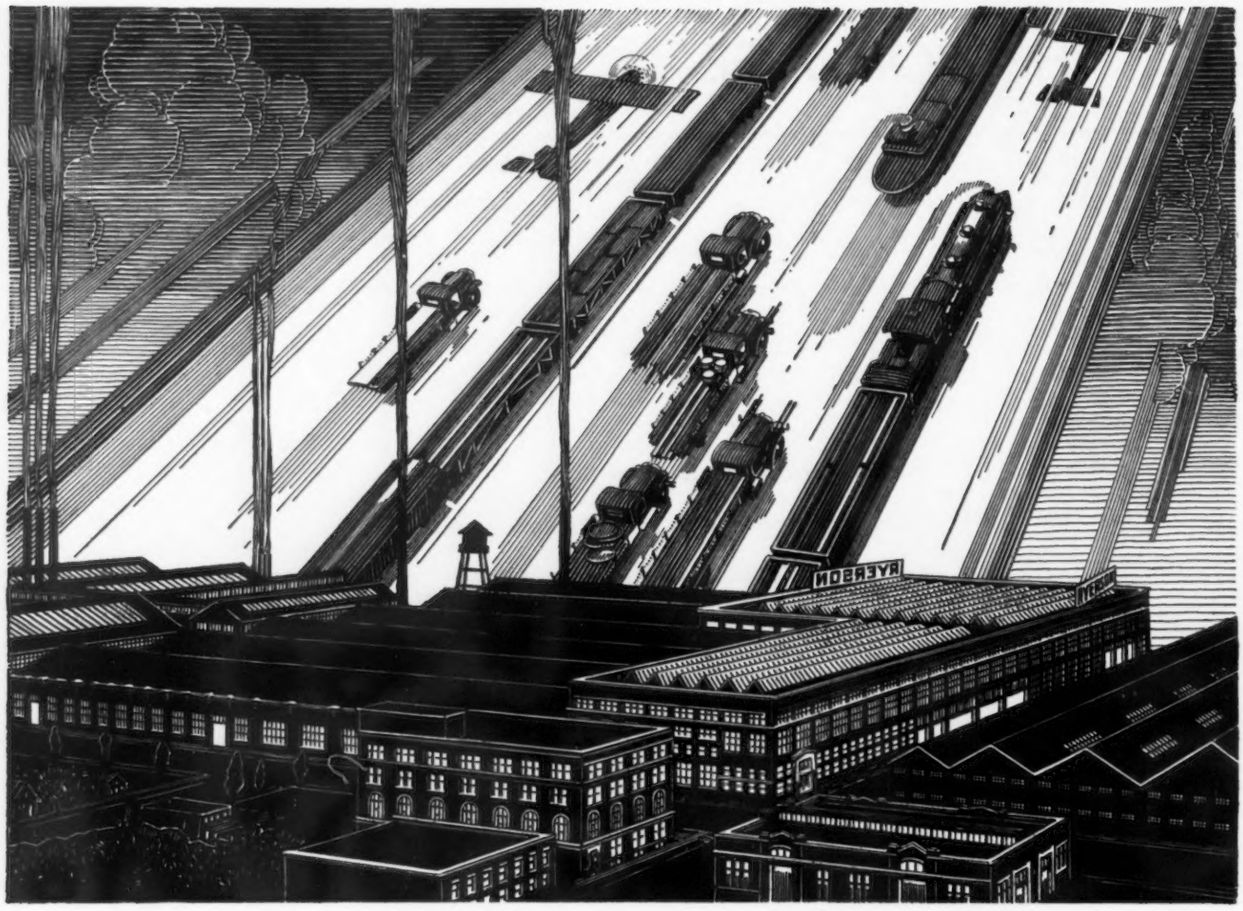

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▲▲▲ THE IRON AGE ▲▲▲

MARCH 8, 1934

ESTABLISHED 1855

Vol. 133, No. 10

No Time to Rock the Boat

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A DEPRESSION-WEARY country, which had long since abandoned hope of a return to the business volume of the prosperous 20's, has had a sudden but by no means rude awakening. The supposedly impossible is happening. A great industry has come back. Demand for automobiles now exceeds 60 days' production—a better demand than has existed since 1929.

What has happened to the motor car trade is spreading to other lines. Better business is creeping up on us. With it has come the realization that if recovery is really our goal, that goal is now within reach. Only poor leadership or renewed dissension in the ranks can arrest the cumulative recuperative forces now gathering momentum.

The current Washington free-for-all for critics of the NRA comes at a crucial time. If it succeeds in undermining codes that have barely reached a workable basis, if it sets in motion a new offensive by organized labor, progress toward recovery will be halted.

Codes cannot be upset without bringing back all the competitive evils that the recovery program has attempted to banish. Widespread industrial disputes cannot be encouraged without crippling the productive forces that make higher wages and increased employment possible.

It is time to recall the main purpose of the recovery act, which was to stop price chiseling and to spread work and raise wage standards. Business men have never lost sight of this aim, and have labored wholeheartedly to achieve it, regardless of their opinions of the wisdom of the recovery program. So far, labor has been the chief beneficiary of what has been accomplished. Profits have been slow to appear. But business men have not complained; they have been good soldiers.

The same cannot be said of organized labor. It is not satisfied with better wages and improved employment, but demands nation-wide unionization as well. Each successful drive for the closed shop has whetted its appetite for more power. And at this very moment it is training its guns on the great industry that gives promise of leading us out of the depression. It has unleashed strikes at scattered points among automotive plants and has succeeded in fomenting unrest throughout the ranks of motor car workers, notwithstanding that their earnings are the best since 1929.

The situation is ominous, but by no means hopeless. A broad breach of industrial peace can be averted by resolute leadership at Washington. With unprecedented prestige and power, the present Administration can hold labor in check if it will. And if it has the courage to do so it will have the overwhelming support of a depression-worn country. The American people have little sympathy for any class group pursuing a "rule or ruin" policy. They have little patience for those who persist in rocking the boat of recovery as it approaches port.

G. L. LACHER
Managing Editor
The Iron Age

G-E Mercury-Vapor-Steam Plant

By R. H. ROGERS
General Electric Co., Schenectady, N. Y.

THE new power station at the Schenectady Works of the General Electric Co. is unique in several ways. First: it is owned by an industry and operated by a utility, and the installed capacity is 26,000 kw. for the use of the New York Power & Light Co. and 650,000 lb. of steam per hour for the use of the General Electric Co. Second: it is a mercury-vapor-steam plant with a product of the mercury-vapor cycle of 325,000 lb. of steam per hour and 20,000 kw. Third: it is an outdoor station in that the main bulk of the steam and mercury boilers, the mercury and steam turbines and principal appurtenances are entirely exposed to the weather. Fourth: it is an arc-welded station throughout—structure, boilers, piping and equipment.

This paper is devoted principally to the A.S.M.E. Boiler Code welding as applied to boilers, piping and other pressure equipment. A brief description of the station is necessary in order to make clear the status of the items coming within the scope of the paper.

Two boilers are installed side-by-side, each with its own complement of coal-handling, storing, pulverizing and feeding equipment and other auxiliaries. One is a more or less conventional steam boiler for producing 325,000 lb. of steam per hour at 400 lb., 750 deg. The other is a mercury-vapor boiler with capacity for operating a 20,000 kw. turbine. The upper portion of its furnace has mercury walls and the lower portion has water walls which produce 85,000 lb. of steam per hour.

The mercury vapor has a pressure of 140 lb. at the boiler and 125 lb. at the turbine; the temperature is 958 deg. The condenser-boilers (which are the condensers for the mercury turbine) and furnace walls deliver 325,000 lb. of steam per hr. Steam transport lines involve 1¾ miles of high-pressure lines and water return lines carried in tunnels and on bridges to the older power stations from which it is distributed for testing, manufacturing and heating.

The structural work was fabricated and erected by the American Bridge Co., and the piping by the Pittsburgh Piping & Equipment Co. The mercury turbine equipment and accessories were fabricated in the General Electric plant. From the regular welding forces of the General Electric Co. some 30 men were qualified through the Hartford Steam Boiler Inspection & Insurance Co. for class I code welding. Of these, six were employed by the Pittsburgh Piping & Equipment Co. for four months in erection work.

THE outdoor mercury-steam-electric power plant built by the General Electric Co. at Schenectady is an engineering development of challenging interest. In principle it is similar to the pioneer mercury-vapor plant installed at Hartford, Conn., in 1923, but has more than 10 times the kilowatt capacity. It is also somewhat different in construction and arrangement.

Unique features include arc-welded fabrication of all major units; and it is the code-welding of the boilers, piping and other pressure equipment that is discussed in this paper, which was presented at a joint meeting of the local sections of the American Society of Mechanical Engineers and the American Welding Society, held in New York, Jan 16. Outstanding in this work was the fabrication of the mercury boiler and of almost a mile of 18-in. and 14-in. pipe designed to deliver steam at 400 lb. and 750 deg. F. at a maximum rate of 500,000 lb. per hr.

Mercury Boilers Require Welding of 3080 Tube Joints

Detail specifications were prepared covering the procedure for qualifying welders and for the shop and field welding as well.

The mercury boiler consists of seven horizontal parallel drums of 30-in. welded pipe, 4-in. thick, suspended from trusses. Down hanging from each drum are 440 porcupine tubes welded inside the drum. In spite of the fact that the welders had to work in this 30-in. diameter space under forced ventilation only two leaks developed during hydrostatic test of the 3080 tube joints involved. The mercury liquid heaters and mercury furnace walls are examples of intricate shop fabrication. Among the other heavy units code-welded in the shop were the governor and safety valve body for the mercury turbine and the mercury turbine condensers.

The piping involved carries liquid mercury, mercury vapor, steam at 400 lb. 750 deg., water at 600 lb. pressure as well as pipes for oil, gas, pulverized fuel and air. In general, the pipe is extra heavy and ranges from 1 to 18 in. in diameter. Flanges were avoided wherever possible; flangeless valves were used and long radius bends prevail at the turns.

High-Pressure Steam Lines of Major Interest

Among the many features of interest, one of the most important was the design of the steam lines between the power station and the General Electric works. These lines convey steam for heating, turbine testing and for manufacturing purposes from the new power plant to distributing points in two old power stations. The total distance involved is 3735 ft., requiring the installation of 4865 ft. of 14-in. high-pressure lines and 4433 ft. of condensate return lines, mostly 8 and 10 in. Steam is delivered at 400 lb. and 750 deg. F. at a maximum rate of 500,000 lb. per hour. The transmission of so much energy through this distance together with the high temperatures, high pressures, and the accompanying expansion problems made this a major piece of work, adjunct as it is to one of the most interesting power stations in the world.

The steam and return lines are car-

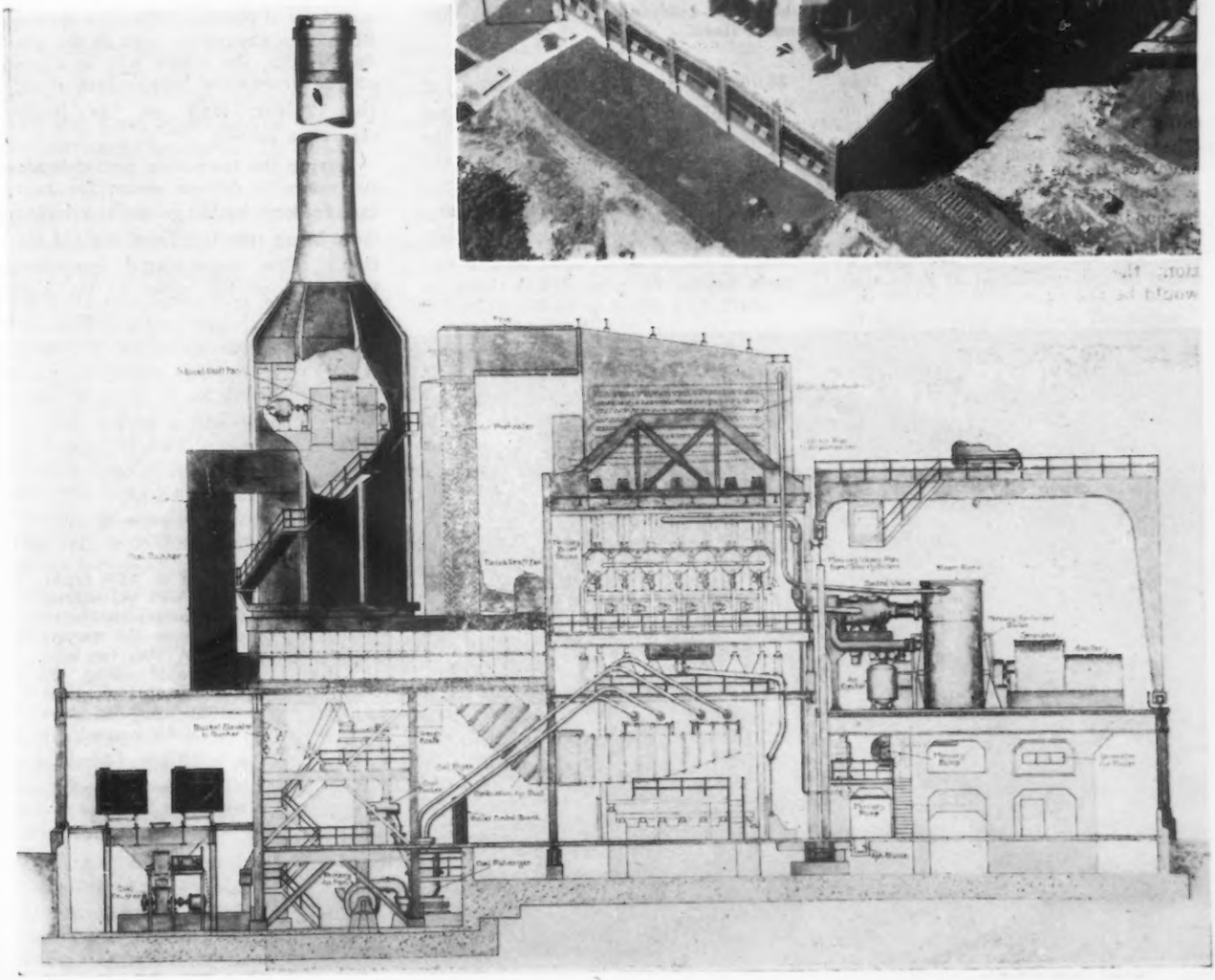
Fusion-Welded Throughout ▲ ▲ ▲

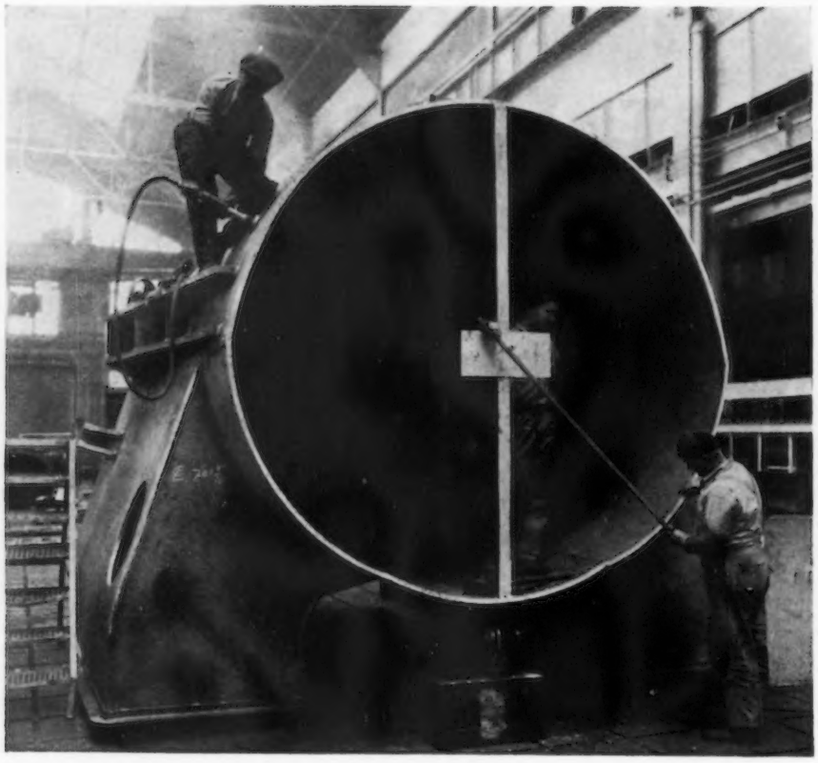
ried in a reinforced concrete tunnel. Short sections where entry is made to the old power stations are carried on skeleton bridges, because they cross various obstructions that precluded the use of tunnels.

In service, the 14-in. high-pressure

Aerial view (at right) of General Electric mercury-steam-electric power station at Schenectady, N. Y. The installed capacity is 26,000 kw. and 650,000 lb. of steam per hour.

Broadside cross-section (below) through the G-E mercury-vapor-steam plant, showing arrangement of the coal handling and pulverizing equipment, stacks, draft fans and ducts, mercury boiler, mercury condenser boiler and other units.





Shop welding one of the two condenser boilers which, in service, are stood on end and connected to the exhaust hoods of the mercury turbine. The condensing of the mercury vapor generates high-pressure steam.

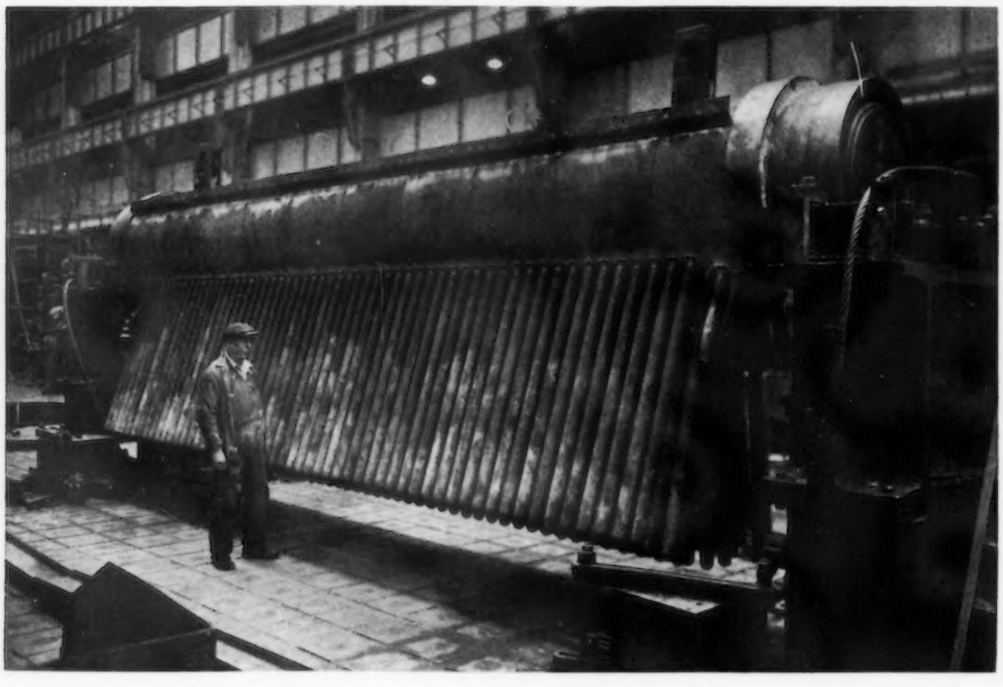
lines contain 2½ tons of steam, traveling at a speed of 4000 ft. per min. The temperature rise to 750 deg. F. involves, in the 4865 ft. of 14-in. pipe, a total linear expansion in the neighborhood of 30 ft. with a potential pipe thrust of 400,000 lb. Without insulation, the radiation at 750 deg. F. would be the equivalent of more than 20,000 kw. equal to the total output of the mercury turbine. These figures make evident the responsibility of the anchorages, the expansion joints, the welded joints and the insulation.

The high-pressure piping is seamless, has a ½-in. wall and the 35-ft. lengths weigh about 2300 lb. It was tack welded to form 200-ft. lengths, and the welding of the joints was completed as the sections were rotated. Position welds joined them to flangeless slip expansion joints which in turn were welded to H-sections embedded in the tunnel side wall, thus providing a rigid anchorage. Self-sealing packing is used under light mechanical pressure as the steam pressure tends to press the truncated-cone rings against the pipe. The joint provides for 18 in. expansion, of which from 14 to 18 in. is actually used.

Weld-fabricated compound roller supports are located under the pipe at 25-ft. intervals. Approximately 22 90-deg. bends were used; those leading to the bridges are of 12-ft. radius. In general, anchor brackets were welded to the short radius bends and in turn to H-frames embedded in the concrete walls or roof.

Two kinds of construction were used for the bridges. The parts nearest the tunnel are built to carry the pipe by suspension, to allow for the expansion of the vertical runs. The pipe next to the buildings is mounted on top of the bridges. A continuous H-section is laid between the bridge and the pipe in order to relieve the structure of possible expansion strains. Should an expansion joint in the pipe fail to slip, the strain will be placed on the practically independent H-section rather than on the bridge structure proper.

During the transition period it was necessary to deliver steam for heating factory buildings as the boilers were being removed from one old station. This necessitated immediate insulation of the pipes as the bare



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Seven of these drums, each with 440 welded-in porcupine tubes, make up the mercury boiler. Only two leaks developed during the hydrostatic tests of the 3080 tube-to-drum welds involved.

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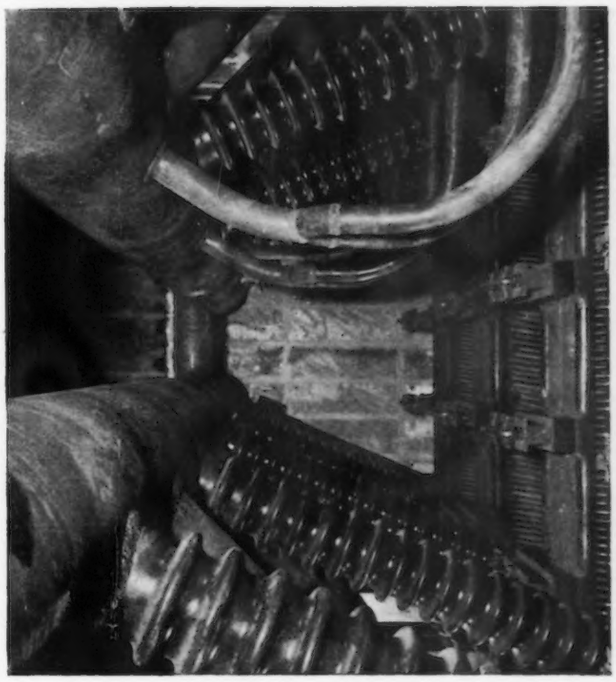
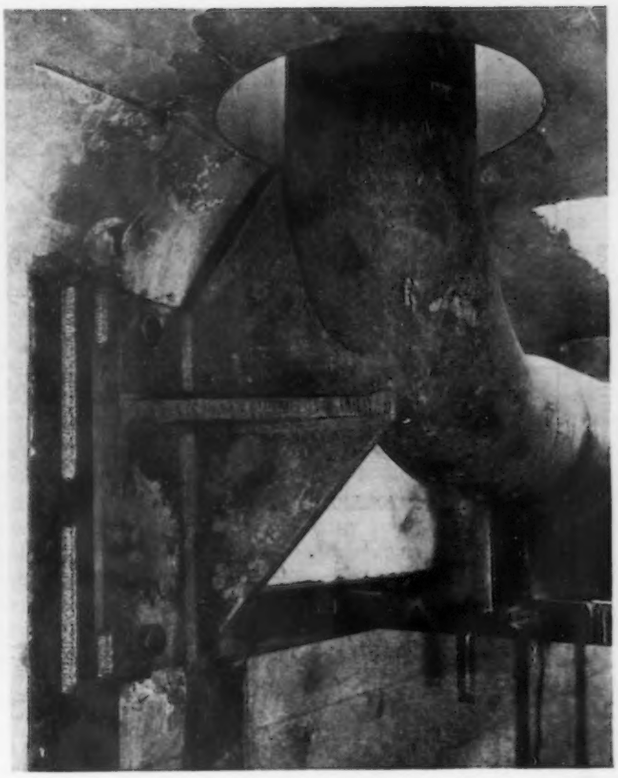




Mercury vapor pipes (above) from seven drums to two headers. The high temperature, 958 deg. F., introduced expansion problems that were met by the use of corrugated pipes.
Welded pipe bend and anchor (at right) located where the 400-lb., 750-deg. F. steam line goes up from the tunnel to the bridge.

pipe radiation would have dissipated most of the heat. The insulation was completed before the joints were tested and upon applying the 225-lb. pressure then available, no leaks developed.

Expansion Roller Support Stands Welded In Place

Stands for the expansion roller supports were fabricated and welded in place. The pipe was brought in through the hatchways and hauled to location on trucks. Fusion rings 1 in. wide by ⅛ in. thick, rolled from strip, were tack welded in the delivery end of each pipe, the welds being made at the inside edge of the ring within the pipe. The lengths were then lifted on to the stands and placed on temporary roller dollies. Six lengths, with the last one cut to make approximately 200 ft., including the chromium plated sliding section in the expansion joint, were strongly tack-welded together at six points at each joint. A split gear was clamped on, and the 200-ft. length was rotated at about one revolution in 6 min., or at a peripheral speed of a little over 7 in. per min., by a small adjustable-speed motor operating through a gear reducer and chain.

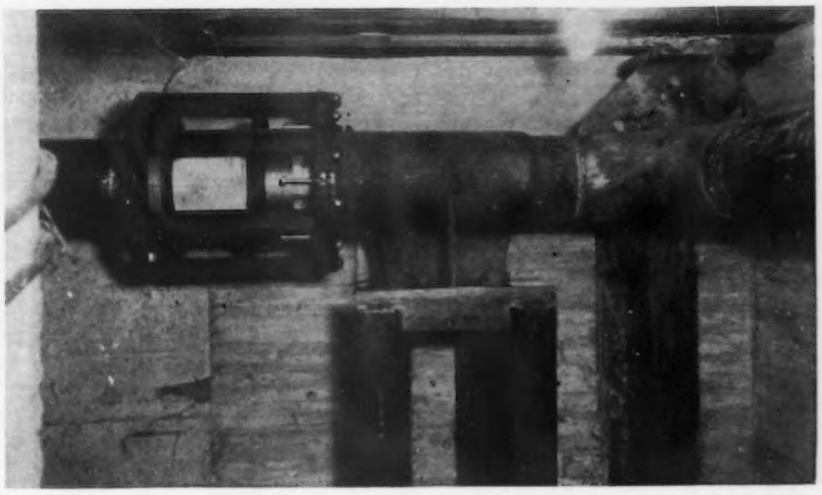
Welding of roll joints involved five passes using heavily coated G-E W-21 electrodes, starting with 3/16 in. at 200 amp. and finishing with ¼ in. at 275 amp. After each pass the slag was chipped off with an air tool which provided some peening effect. The first pass was laid straight and succeeding passes were oscillated increasingly as required to fill the 60-deg. beveled groove. The last pass was slightly crowned and was about ¾ in. wide. All welding was done by hand, using single-operator motor-generator sets.

One Position Weld at Each Expansion Joint

Only one position weld was required at each expansion joint, that being where the 200-ft. line was welded to the stationary member of the expansion joint. These position welds were made with G-E W-20 electrodes in four passes. The weld passes were started at the bottom of the joint and finished at the top, alternating the halves. The succeeding passes were started and finished at staggered points to prevent concentration of starting and finishing joints.

After the position welds, the roller dollies were removed and the roller support members were welded to the

(Concluded on Page 58)



Expansion joint, roller support and anchor at turn on 18-in. pipe line in the tunnel. The pipe is chromium plated at the joint. Joints are located every 200 ft. to take care of a total expansion of more than 30 ft.

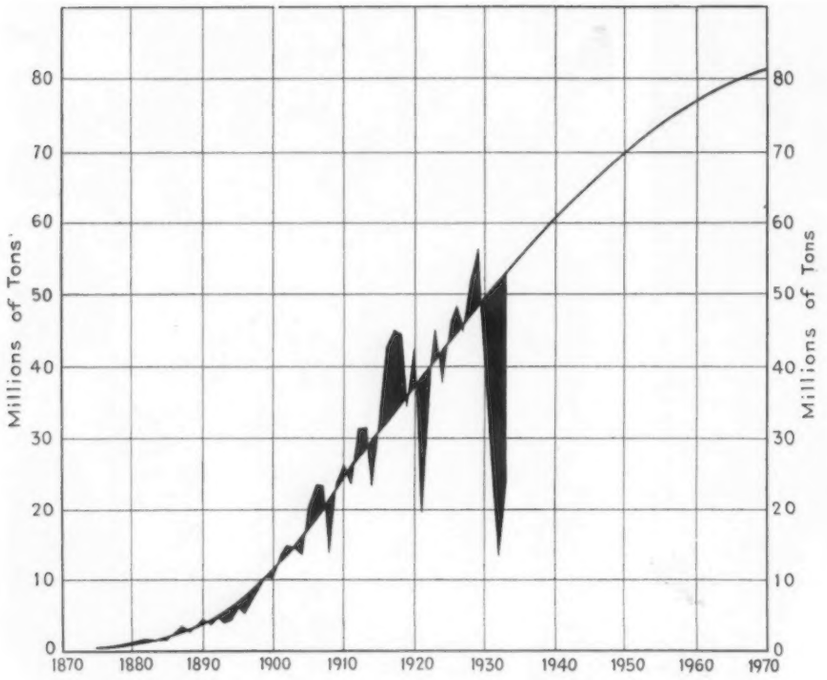


Chart I—Normal curve of production of steel ingots and castings. ▲▲▲

Long Term

By DAVID M. POLAK
Specialist on Code Statistics
Division of Economic Research and Planning
National Recovery Administration, Washington

ANALYSIS of production of iron and steel by decades, between 1870 and 1930, brings to light the interesting fact that the rate of growth is slowing down at an extremely rapid rate.

Translated into terms of future trend, the conclusion is inescapable that, although use of steel will continue to increase in the years to come, the average annual rate of increase will gradually diminish. A period is approaching, sooner than perhaps is generally suspected, when the steel industry will be unable to show satisfactory gains in production over the long term.

Three major factors, all pulling in the same direction, are responsible for this outcome. The first is well known in every industry and is a normal occurrence to the extent that it is inescapable. The life curve of every industry, if smoothed sufficiently, resembles a distorted letter S. A better description would be to liken it to the left side of a church bell. The curve is divided into three parts representing (1) the initial period of slowly gathering impetus corresponding to the lip of the bell; (2) the second period of rapid growth, in which advertising plays a prominent part—the side of the bell; and (3) the final period of comparative stability when the industry is no longer capable of growth, owing to saturation. In this period its maintenance is entirely the result of replacement demand. This latter portion of the curve is the top of the bell. In some industries, this has been followed by a downward curve, completing the other half, as the industry died off owing to some invention in a competitive field.

Examination of Chart I, Annual Production of Steel, clearly shows that the steel industry is no exception to this rule. A Gompertz trend line has been fitted to the annual figures and indicates that the industry is well along to a point near the inception of the third or stabilization period. This means that as a result of the operation of natural forces the steel industry of the future must advance more slowly. An example of a contributing factor is the heavy demand for steel in building new railroads which has given way to replacement orders almost entirely.

The second major factor which will have an important bearing on the demand for steel in future years is population. Examination of subsequent charts will show that the rate of annual increase in population has progressively fallen off since 1880. A further sharp falling off (based on birth and death rates and immigration) is to be expected, according to recognized authorities. The population forecasting line upon which this study is based is a composite of several such estimates made by qualified experts.

Accompanying figures illustrate the extent of the gradual falling off which has taken place in the rate of increase of population in continental United States. They point to a drastic falling off, following 1930.

The third major factor which will operate to stabilize steel production in future years lies in the per capita demand. The rate of increase in per capita demand has progressively diminished from decade to decade

TABLE I. POPULATION IN UNITED STATES—BY DECADES

Year	Population Continental United States	Increase for Decade	
		Actual	Per Cent
1870	38,655,000	.....	....
1880	50,262,000	11,607,000	30.0
1890	63,056,000	12,794,000	25.5
1900	76,129,000	13,073,000	20.8
1910	92,267,000	16,138,000	21.2
1920	106,543,000	14,276,000	15.5
1930	122,500,000	15,957,000	15.0
Forecast			
1940	132,000,000	9,500,000	7.8
1950	139,400,000	7,400,000	5.6
1960	145,000,000	5,600,000	4.0
1970	148,000,000	3,000,000	2.1

Outlook in Iron and Steel ▲ ▲ ▲

since 1870. A continuation of this trend is the only reasonable expectation.

Table II illustrates the extent to which the rate of increase in per capita production of iron and steel has diminished from decade to decade.

Each of the three factors likely to exert a restraining influence on the growth of iron and steel production were allowed for in estimating the future trends. The trend in any period under consideration is, of course, a smooth curve closely fitting the data under review. The nature of the "fit" is such that the deviation of the curve from the basic material is less than the deviation of any other curve that might be fitted to the series. In fact in this study it will be pointed out that the trend lines about which the yearly data fluctuate fit the original data with extreme accuracy. The projection of the trends into the future are the most reasonable estimates of what is likely to be on the average, over the long term, the production of iron and steel, according to a scientific determination based on past performance. It cannot attempt to forecast production in any single year.

The method followed in fitting the trends both to pig iron and to steel ingots and castings was identical in form. It will be briefly described here and treated in greater detail elsewhere. For the time being, it will suffice to say that the production trends in tons were obtained by working out trends on a pound-per-capita basis and multiplying the trend thus found by actual population in each year between 1873 and 1932, and by estimated population in subsequent years to 1970, inclusive. By use of this method due allowance was made for decline in rate of increase of use per capita and decline in rate of increase of population growth. Further allowance was made for the decline in rate of increase of production indicated previously by application of the Gompertz* formula to the data under review. This formula, when applied to secular trend, describes a distorted S-shaped curve on arithmetic chart paper corresponding to the example cited above as normal in the life his-

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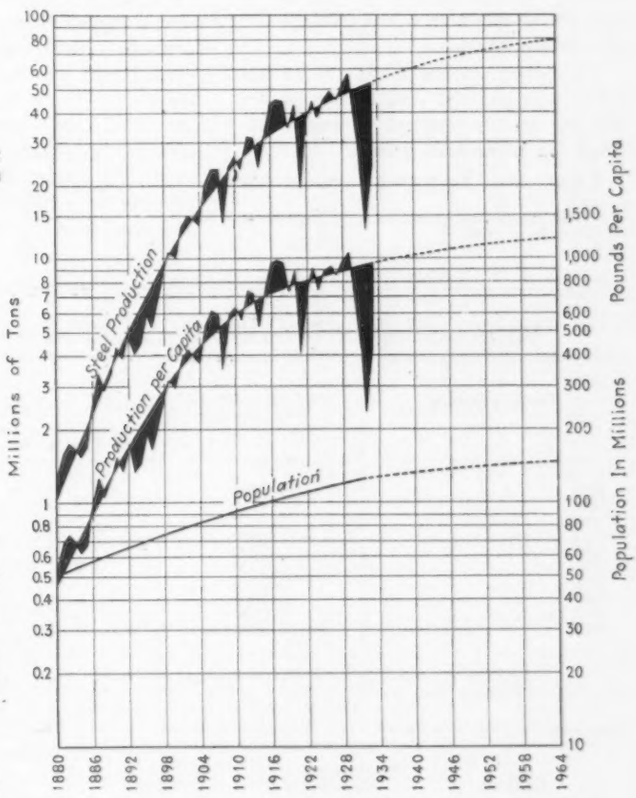
Chart III—(At right): Total and per capita production of steel.



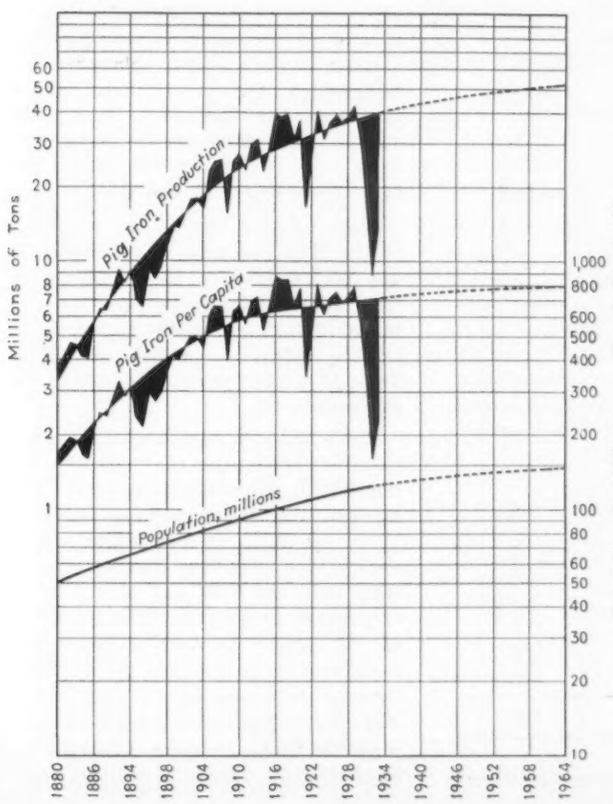


Chart II—(At left): Total and per capita production of pig iron.

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* The Law of Growth in Forecasting Demand by Raymond B. Prescott, published in the quarterly publication of the American Statistical Association, December, 1922, treats of the theory and practical application of the use of the Gompertz curve in series in which population is a factor.

TABLE II. PRODUCTION, IRON AND STEEL—POUNDS PER CAPITA—BY DECADES

Decade	Production—Pounds Per Capita		Increase for Decade Pounds Per Capita		Per Cent Increase for Decade	
	Steel Ingots and Castings	Pig Iron and Ferroalloys	Steel Ingots and Castings	Pig Iron and Ferroalloys	Steel Ingots and Castings	Pig Iron and Ferroalloys
1871-1880	239.3	1,192.5	.....	.....	.....	.....
1881-1890	949.5	2,198.0	710.2	1,005.5	296.8	84.3
1891-1900	2,059.8	3,106.9	1,110.3	908.9	116.9	41.4
1901-1910	4,907.3	5,538.1	2,847.5	2,431.2	138.2	78.3
1911-1920	7,818.3	7,201.9	2,911.0	1,663.8	59.3	30.0
1921-1930	8,197.6	6,573.6	379.3	(d) 628.3	4.9	(d) 8.7

(d) Decrease.

Note—In the above, the period 1891-1900 witnessed two severe depressions, which brought the production per capita below that of the ensuing decade.

tory of every industry. Chart I illustrated the shape of the curve fitted to production of steel ingots and castings.

Pig Iron and Ferroalloys

Table III presents for each year from 1870 to 1933 pig iron and ferroalloy production, both total and per capita. It also shows the calculated long term trends on a total and pound per capita basis.

Population shown therein is actual 1870 through 1932 and estimated according to the method already outlined for subsequent years.

From the percentage deviations shown yearly a determination can be made of the accuracy of "fit" of the trends in each year. Over the period 1870 to 1933* the variation of the actual from the calculated trend of production in pounds per capita amounted to only 2.4 per cent.

The material introduced in Table III has been charted and is presented as Chart II. This is a ratio chart in which equal distances up the scale represent the same proportional increase and similarly equal distances down the scale represent the same percentage of decrease. The chart clearly delineates the fact that the rates of increase in actual production, per capita production and population are slowing down.

* 1933 estimated from figures furnished by The Iron Age.

TABLE IV. PIG IRON AND FERROALLOYS—GROSS TONS PER CAPITA TREND VOLUME AND PERCENTAGE OF INCREASE, FOR DECADES

Decade Ended	Trend Gross Tons Per Capita	Increase	
		Trend Gross Tons Per Capita	Per Cent
1880	0.4848	.....	....
1890	0.9715	0.4867	100.4
1900	1.6270	0.6555	67.5
1910	2.3080	0.6810	41.9
1920	2.7900	0.4820	20.9
1930	3.0200	0.2300	8.2
1940	3.2300	0.2100	7.0
1950	3.3900	0.1600	5.0
1960	3.5000	0.1100	3.2
1970	3.5700	0.0700	2.0

TABLE V. PIG IRON AND FERROALLOYS—ACTUAL AND TREND OF PRODUCTION IN POUNDS PER CAPITA PER CENT DEVIATION OF ACTUAL FROM TREND, FOR DECADES

Decade	Production Pounds Per Capita	Trend Pounds Per Capita	Deviation of Actual from Trend	
			Pounds Per Capita	Per Cent
1870*	96.6	67.5	29.1	43.2
1871-1880	1192.5	1085.9	106.6	9.8
1881-1890	2198.0	2175.9	22.1	1.0
1891-1900	3106.9	3645.1	−538.2	−14.9
1901-1910	5538.1	5192.4	345.7	6.7
1911-1920	7201.9	6243.9	958.0	15.3
1921-1930	6573.6	6767.0	−193.4	− 2.9
1931*	332.8	703.0	−370.2	−52.7
1932*	157.7	708.0	−550.3	−77.7
1933* Est	235.5	712.0	−476.5	−66.9
	26633.6	27300.7	−667.1	− 2.4

* Year only.

The forecasting line indicates that average production of pig iron and ferroalloys is likely to advance in percentage only as much in the 31 years between 1933 and 1964 as it did in the previous 14 years from 1919 to 1933. An equivalent gain in percentage was achieved in 10 years prior to 1919 and in progressively shorter periods back to 1880 where the chart begins.

Summarizations have been made of the rates of increase from decade to decade. The summary covering population was included in Table I. Table II contained an extract of the rate of increase in production of pig iron per capita between 1871 and 1930.

Table IV shows the long term trend in gross tons per capita of pig iron and ferroalloys by decades, and the percentage of increase in volume for each decade. It is of extreme interest to note that the actual increase in gross tons of indicated physical volume of production is progressively smaller in each decade subsequent to that ended in 1910. If these figures were stated in terms of a single year, the average increase in trend per year from 1930 to 1940 would be only seven-tenths of one per cent.

Table V is a test of the accuracy of the fit of the trend by decades over the period 1870 to 1933 and shows that, allowing for rounding of a great many figures, the extent of the error of the actual from the calculated trend of pounds per capita is only 2.4 per cent.

Table VI is a comparison, by decades, of the volume of production of pig iron and ferroalloys in gross tons, against the trend volume between 1870 and 1933. It also indicates for each of the next four decades ending with 1970 the total probable volume of pig iron production. The deviation of the actual production from the calculated trend over the period 1870 through 1933 was only 3.9 per cent. The percentage of increase of the probable trend becomes successively smaller from decade to decade, and,

TABLE III. PIG IRON AND FERROALLOY PRODUCTION AND LONG-TERM TREND

Year	Production Pig Iron and Ferroalloys Gross Ton	Population Continental United States	Pig Iron Production Per Capita		Trend Pig Iron Production Pounds Per Capita	Deviation Production Per Capita from Trend		Trend Pig Iron Production Gross Tons	Deviation Production from Trend	
			Gross Tons	Pounds		No. Pounds	Per Cent		Gross Tons	Per Cent
1870.....	1,665,000	38,655,000	.0431	96.6	67.5	29.1	43.2	1,167,000	498,000	42.7
1871.....	1,707,000	39,815,000	.0429	96.1	74.0	22.1	29.9	1,314,000	393,000	29.9
1872.....	2,549,000	40,974,000	.0622	139.3	81.0	58.3	72.0	1,483,000	1,066,000	71.8
1873.....	2,561,000	42,134,000	.0608	136.2	88.0	48.2	54.8	1,654,000	907,000	54.8
1874.....	2,401,000	43,294,000	.0555	124.3	95.0	29.3	30.8	1,836,000	565,000	30.8
1875.....	2,024,000	44,454,000	.0456	102.2	102.6	— 0.4	— 0.4	2,038,000	— 14,000	— 0.7
1876.....	1,869,000	45,613,000	.0410	91.8	111.0	— 19.2	—17.3	2,240,000	— 371,000	—16.6
1877.....	2,067,000	46,773,000	.0442	99.0	119.0	— 20.0	—16.8	2,487,000	— 420,000	—16.9
1878.....	2,301,000	47,933,000	.0480	107.5	128.0	— 20.5	—16.0	2,740,000	— 439,000	—16.0
1879.....	2,742,000	49,093,000	.0559	125.3	138.0	— 12.7	— 9.2	3,020,000	— 278,000	— 9.2
1880.....	3,835,000	50,262,000	.0763	170.8	149.3	21.5	14.4	3,350,000	485,000	14.5
1881.....	4,144,000	51,542,000	.0804	180.1	161.0	19.1	11.9	3,700,000	444,000	12.0
1882.....	4,623,000	52,821,000	.0875	196.0	173.0	23.0	13.3	4,080,000	543,000	13.3
1883.....	4,596,000	54,100,000	.0850	190.4	185.0	5.4	2.9	4,470,000	126,000	2.8
1884.....	4,098,000	55,379,000	.0740	165.7	197.0	— 31.3	—15.9	4,870,000	— 772,000	—15.9
1885.....	4,045,000	56,658,000	.0714	159.9	208.4	— 48.5	—23.3	5,270,000	— 1,225,000	—23.2
1886.....	5,683,000	57,937,000	.0982	220.0	222.0	— 2.0	— 0.9	5,740,000	— 57,000	— 1.0
1887.....	6,417,000	59,217,000	.1083	242.6	236.0	6.6	2.8	6,240,000	171,000	2.8
1888.....	6,490,000	60,496,000	.1073	240.3	250.0	— 9.7	— 3.9	6,750,000	— 260,000	— 3.9
1889.....	7,604,000	61,775,000	.1232	276.0	265.0	11.0	4.2	7,310,000	294,000	4.0
1890.....	9,203,000	63,056,000	.1460	327.0	278.5	48.5	17.4	7,850,000	1,353,000	17.2
1891.....	8,280,000	64,361,000	.1287	288.3	293.0	— 4.7	— 1.6	8,420,000	— 140,000	— 1.7
1892.....	9,157,000	65,666,000	.1395	312.5	309.0	3.5	1.2	9,060,000	97,000	1.1
1893.....	7,125,000	66,970,000	.1064	238.3	325.0	— 86.7	—26.7	9,720,000	— 2,595,000	—26.7
1894.....	6,657,000	68,275,000	.0975	218.3	340.0	—121.7	—35.8	10,370,000	— 3,713,000	—35.8
1895.....	9,446,000	69,580,000	.1358	304.2	356.6	— 52.4	—14.7	11,080,000	— 1,634,000	—14.7
1896.....	8,623,000	70,885,000	.1217	272.6	372.0	— 99.4	—26.7	11,780,000	— 3,157,000	—26.8
1897.....	9,653,000	72,189,000	.1338	299.8	388.0	— 88.2	—22.7	12,510,000	— 2,857,000	—22.8
1898.....	11,774,000	73,494,000	.1602	359.0	404.0	— 45.0	—11.1	13,260,000	— 1,486,000	—11.2
1899.....	13,621,000	74,799,000	.1821	407.9	420.0	— 12.1	— 2.9	14,030,000	— 409,000	— 2.9
1900.....	13,789,000	76,129,000	.1812	406.0	437.5	— 31.5	— 7.2	14,870,000	— 1,081,000	— 7.3
1901.....	15,878,000	77,747,000	.2041	457.1	452.0	5.1	1.1	15,680,000	198,000	1.3
1902.....	17,821,000	79,365,000	.2246	501.2	467.0	34.2	7.3	16,560,000	1,261,000	7.6
1903.....	18,009,000	80,983,000	.2225	498.5	483.0	15.5	3.2	17,460,000	549,000	3.1
1904.....	16,497,000	82,601,000	.1996	447.0	498.0	— 51.0	—10.2	18,370,000	— 1,873,000	—10.2
1905.....	22,992,000	84,219,000	.2730	611.8	514.3	97.5	18.9	19,340,000	3,652,000	18.9
1906.....	25,307,000	85,837,000	.2950	661.0	530.0	131.0	24.7	20,600,000	4,707,000	22.8
1907.....	25,781,000	87,455,000	.2948	660.0	544.0	116.0	21.3	21,250,000	4,531,000	21.3
1908.....	15,936,000	89,073,000	.1789	401.0	557.0	—156.0	—28.0	22,160,000	— 6,224,000	—28.1
1909.....	25,795,000	90,691,000	.2844	637.0	568.0	69.0	12.1	23,010,000	2,785,000	12.1
1910.....	27,304,000	92,267,000	.2961	663.5	579.1	84.4	14.6	23,870,000	3,434,000	14.4
1911.....	23,650,000	93,682,000	.2525	566.0	589.0	— 23.0	— 3.9	24,640,000	— 990,000	— 4.0
1912.....	29,727,000	95,097,000	.3125	700.1	599.0	101.1	16.9	25,440,000	4,287,000	16.8
1913.....	30,966,000	96,512,000	.3209	718.5	608.0	110.5	18.2	26,190,000	4,776,000	18.2
1914.....	23,332,000	97,928,000	.2385	534.5	617.0	— 82.5	—13.4	26,980,000	— 3,648,000	—13.5
1915.....	29,916,000	99,343,000	.3013	675.0	624.9	50.1	8.0	27,710,000	2,206,000	8.0
1916.....	39,435,000	100,758,000	.3915	877.0	632.0	245.0	38.8	28,420,000	11,015,000	38.7
1917.....	38,621,000	102,173,000	.3785	848.0	636.0	212.0	33.3	29,000,000	9,621,000	33.2
1918.....	39,055,000	103,588,000	.3770	844.8	641.0	203.8	31.8	29,650,000	9,405,000	31.7
1919.....	31,015,000	105,003,000	.2954	662.0	646.0	16.0	2.5	30,300,000	715,000	2.4
1920.....	36,926,000	106,543,000	.3465	776.0	651.0	125.0	19.2	30,950,000	5,976,000	19.3
1921.....	16,688,000	108,208,000	.1542	345.4	655.0	—309.6	—47.3	31,600,000	—14,912,000	—47.2
1922.....	27,220,000	109,873,000	.2478	555.0	660.0	—105.0	—15.9	32,400,000	— 5,180,000	—16.0
1923.....	40,361,000	111,537,000	.3617	810.2	665.0	145.2	21.8	33,100,000	7,261,000	21.9
1924.....	31,406,000	113,202,000	.2776	622.0	670.0	— 48.0	— 7.2	33,850,000	— 2,444,000	— 7.2
1925.....	36,701,000	114,867,000	.3195	716.0	675.0	41.0	6.1	34,600,000	2,101,000	6.1
1926.....	39,373,000	116,532,000	.3377	756.5	679.0	77.5	11.4	35,300,000	4,073,000	11.5
1927.....	36,566,000	118,197,000	.3095	691.5	684.0	7.5	1.1	36,100,000	466,000	1.3
1928.....	38,156,000	119,862,000	.3184	713.5	688.0	25.5	3.7	36,800,000	1,356,000	3.7
1929.....	42,614,000	121,526,000	.3509	786.0	693.0	93.0	13.4	37,600,000	5,014,000	13.3
1930.....	31,752,000	122,500,000	.2578	577.5	698.0	—120.5	—17.3	38,200,000	— 6,448,000	—16.9
1931.....	18,426,000	123,600,000	.1485	332.8	703.0	—370.2	—52.7	38,800,000	—20,374,000	—52.5
1932.....	8,781,000	124,700,000	.0704	157.7	708.0	—550.3	—77.7	39,400,000	—30,619,000	—77.7
1933*....	13,213,000	125,700,000	.1051	235.5	712.0	—476.5	—66.9	39,900,000	—26,687,000	—66.9
1934.....	.....	126,700,000	.....	.....	717.0	.....	.....	40,500,000	.....	.....
1935.....	.....	127,600,000	.....	.....	722.0	.....	.....	41,100,000	.....	.....
1936.....	.....	128,500,000	.....	.....	726.0	.....	.....	41,700,000	.....	.....
1937.....	.....	129,400,000	.....	.....	730.0	.....	.....	42,200,000	.....	.....
1938.....	.....	130,300,000	.....	.....	734.0	.....	.....	42,700,000	.....	.....
1939.....	.....	131,200,000	.....	.....	738.0	.....	.....	43,200,000	.....	.....
1940.....	.....	132,000,000	.....	.....	741.5	.....	.....	43,700,000	.....	.....
1941.....	.....	132,800,000	.....	.....	745.0	.....	.....	44,200,000	.....	.....
1942.....	.....	133,600,000	.....	.....	748.0	.....	.....	44,600,000	.....	.....
1943.....	.....	134,400,000	.....	.....	752.0	.....	.....	45,100,000	.....	.....
1944.....	.....	135,200,000	.....	.....	755.0	.....	.....	45,600,000	.....	.....
1945.....	.....	135,900,000	.....	.....	758.2	.....	.....	46,000,000	.....	.....
1946.....	.....	136,600,000	.....	.....	762.0	.....	.....	46,400,000	.....	.....
1947.....	.....	137,300,000	.....	.....	764.0	.....	.....	46,800,000	.....	.....
1948.....	.....	138,000,000	.....	.....	767.0	.....	.....	47,200,000	.....	.....
1949.....	.....	138,700,000	.....	.....	769.0	.....	.....	47,600,000	.....	.....
1950.....	.....	139,400,000	.....	.....	771.8	.....	.....	48,000,000	.....	.....
1951.....	.....	140,000,000	.....	.....	774.0	.....	.....	48,400,000	.....	.....
1952.....	.....	140,600,000	.....	.....	777.0	.....	.....	48,800,000	.....	.....
1953.....	.....	141,200,000	.....	.....	779.0	.....	.....	49,100,000	.....	.....
1954.....	.....	141,800,000	.....	.....	781.0	.....	.....	49,400,000	.....	.....
1955.....	.....	142,400,000	.....	.....	782.7	.....	.....	49,800,000	.....	.....
1956.....	.....	143,000,000	.....	.....	786.0	.....	.....	50,200,000	.....	.....
1957.....	.....	143,500,000	.....	.....	788.0	.....	.....	50,500,000	.....	.....
1958.....	.....	144,000,000	.....	.....	789.0	.....	.....	50,700,000	.....	.....
1959.....	.....	144,500,000	.....	.....	790.0	.....	.....	50,900,000	.....	.....
1960.....	.....	145,000,000	.....	.....	791.6	.....	.....	51,200,000	.....	.....
1961.....	.....	145,400,000	.....	.....	793.0	.....	.....	51,500,000	.....	.....
1962.....	.....	145,800,000	.....	.....	795.0	.....	.....	51,700,000	.....	.....
1963.....	.....	146,200,000	.....	.....	797.0	.....	.....	52,000,000	.....	.....
1964.....	.....	146,500,000	.....	.....	798.0	.....	.....	52,200,000	.....	.....
1965.....	.....	146,800,000	.....	.....	798.9	.....	.....	52,400,000	.....	.....
1966.....	.....	147,100,000	.....	.....	801.0	.....	.....	52,600,000	.....	.....
1967.....	.....	147,400,000	.....	.....	802.0	.....	.....	52,800,000	.....	.....
1968.....	.....	147,700,000	.....	.....	803.0	.....	.....	53,000,000	.....	.....
1969.....	.....	147,900,000	.....	.....	804.0	.....	.....	53,100,000	.....	.....
1970.....	.....	148,000,000	.....	.....	804.6	.....	.....	53,200,000	.....	.....

* Production partly estimated by Iron Age.

TABLE VI. PRODUCTION PIG IRON AND FERROALLOYS—FOR DECADES—IN GROSS TONS

Decade	Actual Gross Tons	Increase		Trend Gross Tons	Increase		Deviation of Actual from Trend	
		Actual Gross Tons	Per Cent		Trend Gross Tons	Per Cent	Gross Tons	Per Cent
1870*	1,665,000	.....	.....	1,167,000	.....	.....	498,000	42.7
1871-1880	24,056,000	.....	.....	22,162,000	.....	.....	1,894,000	8.5
1881-1890	56,903,000	32,847,000	136.5	56,280,000	34,118,000	154.0	623,000	1.1
1891-1900	98,125,000	41,222,000	72.4	115,100,000	58,820,000	104.6	−16,975,000	−14.7
1901-1910	211,320,000	113,195,000	115.3	198,300,000	83,200,000	72.3	13,020,000	6.6
1911-1920	322,643,000	111,323,000	52.7	279,280,000	80,980,000	40.8	43,363,000	15.5
1921-1930	340,837,000	18,194,000	5.6	349,550,000	70,270,000	25.1	− 8,713,000	− 2.5
1931*	18,426,000	.....	.....	38,800,000	.....	.....	−20,374,000	−52.5
1932*	8,781,000	.....	.....	34,400,000	.....	.....	−30,619,000	−77.7
1933* Est.	13,213,000	.....	.....	39,900,000	.....	.....	−26,687,000	−66.9
Totals	1,095,969,000	.....	.....	1,139,939,000	.....	.....	−43,970,000	− 3.9
1931-1940	.....	.....	.....	413,200,000	63,650,000	18.2	.....	....
1941-1950	.....	.....	.....	461,500,000	48,300,000	11.7	.....	....
1951-1960	.....	.....	.....	499,000,000	37,500,000	8.1	.....	....
1961-1970	.....	.....	.....	524,500,000	25,500,000	5.1	.....	....

* Year only.

TABLE VII. INTERCEPTS AT END OF EACH DECADE—PRODUCTION PIG IRON AND FERROALLOYS

Decade Ended	Actual Production Gross Tons	Increase		Trend Gross Tons	Increase		Per Capita Trend Gross Tons	Increase	
		Production Gross Tons	Per Cent		Trend Gross Tons	Per Cent		Per Capita Trend Gross Tons	Per Cent
1880	3,835,000	.....	.....	3,350,000	.....	.....	0.0666	.....	....
1890	9,203,000	5,368,000	140.0	7,850,000	4,500,000	134.3	0.1243	0.0577	86.6
1900	13,789,000	4,586,000	49.8	14,870,000	7,020,000	89.4	0.1950	0.0707	56.9
1910	27,304,000	13,515,000	98.0	23,870,000	9,000,000	60.5	0.2580	0.0630	32.3
1920	36,926,000	9,622,000	35.2	30,950,000	7,080,000	29.7	0.2910	0.0330	12.8
1930	31,752,000	*5,174,000	*14.0	38,200,000	7,250,000	23.4	0.3120	0.0210	7.2
1940	.....	.....	.....	43,700,000	5,500,000	14.4	0.3310	0.0190	6.1
1950	.....	.....	.....	48,000,000	4,300,000	9.8	0.3440	0.0130	3.9
1960	.....	.....	.....	51,200,000	3,200,000	6.7	0.3530	0.0090	2.6
1970	.....	.....	.....	53,200,000	2,000,000	3.9	0.3590	0.0060	1.7

* Decrease.

taken on an average yearly basis, from an increase of 1.8 per cent annually from 1931-1940, it rapidly dwindles to only 0.5 per cent per year from 1961-1970.

While, of course, it is quite impossible to state 40 years in advance just exactly what the production of pig iron or steel is going to be, either for a single year or even for a decade, nevertheless these figures, based on a highly scientific method of approach, have shown a remarkable degree of accuracy for the period 1870-1933 in which actual results can be checked against the trend line. As an estimate of future production, they are perhaps a degree more accurate than many forecasts heretofore less scientifically made, and for that reason alone should be of comparatively more importance in reasoning toward a conclusion in terms of control of increases in capacity and return on invested capital.

Table VII is of interest because it attempts to "spot" the probable trend of pig iron production, both in actual gross tons and gross tons per capita for each decade year, and shows the per cent of increase between the intercepts (trend values) for each decade. This table is not intended to estimate actual production in any decade year; the most it can do is to show for any decade year the percentage of increase in trend since the previous intercept.

There can remain little doubt that the rate of increase in production of pig iron has been slowing down since 1870. Indications are that this slowing down will continue into the future, so that by 1970 the yearly rate of increased growth will be practically nil.

Steel Ingots and Castings, 1870-1970

The statistical treatment of steel ingot and casting production must necessarily be identical with that of pig iron. Chart III shows the actual production of steel as well as the trend of steel production, both in millions of tons and in pounds per capita. Nineteen Thirty-three production is partly estimated on the basis of figures supplied by The Iron Age. This chart also shows actual population between 1880 and 1932 and forecasting lines as far ahead as the year 1964.

A comparison of Chart II on Pig Iron with Chart III on Steel brings out the interesting fact that the trend of iron production has increased at a somewhat slower rate than did that of

TABLE IX. STEEL INGOTS AND CASTINGS—GROSS TONS PER CAPITA, TREND VOLUME AND PERCENTAGE OF INCREASE, FOR DECADES

Decade Ended	Trend Gross Tons Per Capita	Increase	
		Trend Gross Tons Per Capita	Per Cent
1880	0.1158	.....	.....
1890	0.4061	0.2903	250.9
1900	1.0740	0.6679	164.6
1910	2.1300	1.0560	98.4
1920	3.1650	1.0350	48.6
1930	3.8050	0.6400	20.2
1940	4.3700	0.5650	14.9
1950	4.8500	0.4800	11.0
1960	5.1900	0.3400	7.0
1970	5.4300	0.2400	4.6

TABLE VIII. STEEL INGOT AND CASTINGS PRODUCTION AND LONG-TERM TREND

Year	Production Steel Ingots and Castings Gross Tons	Population Continental United States	Steel Production Per Capita		Trend Steel Production Pounds Per Capita	Deviation Production Per Capita from Trend		Trend Steel Production Gross Tons	Deviation Production from Trend	
			Gross Tons	Pounds		No. Pounds	Per Cent		Gross Tons	Per Cent
1870	67,000*	38,655,000	.0017	3.8*	9.9	— 6.1	−61.6	171,000	— 104,000	−60.8
1871	73,000*	39,815,000	.0018	4.0*	10.0	— 6.0	−60.0	178,000	— 105,000	−59.0
1872	143,000	40,974,000	.0035	7.8	12.0	— 4.2	−35.0	220,000	— 77,000	−35.0
1873	199,000	42,134,000	.0047	10.5	16.0	— 5.5	−34.4	301,000	— 102,000	−33.9
1874	216,000	43,294,000	.0050	11.2	19.0	— 7.8	−40.5	367,000	— 151,000	−41.2
1875	390,000	44,454,000	.0088	19.7	21.6	— 1.9	— 8.8	429,000	— 39,000	— 9.1
1876	533,000	45,613,000	.0117	26.2	28.0	— 1.8	— 6.4	570,000	— 37,000	— 6.5
1877	569,000	46,773,000	.0122	27.3	31.0	— 3.7	−11.9	648,000	— 79,000	−12.2
1878	732,000	47,933,000	.0153	34.3	35.0	— .7	— 2.0	748,000	— 16,000	— 2.1
1879	935,000	49,093,000	.0191	42.8	40.0	2.8	7.0	877,000	58,000	6.6
1880	1,247,000	50,262,000	.0248	55.5	46.9	8.6	18.3	1,053,000	194,000	18.4
1881	1,588,000	51,542,000	.0308	69.0	52.0	17.0	32.7	1,196,000	392,000	32.8
1882	1,737,000	52,821,000	.0329	73.7	60.0	13.7	22.8	1,414,000	323,000	22.8
1883	1,674,000	54,100,000	.0309	69.2	66.0	3.2	4.8	1,594,000	80,000	5.0
1884	1,551,000	55,379,000	.0280	62.7	73.0	— 10.3	−14.1	1,806,000	— 255,000	−14.1
1885	1,712,000	56,658,000	.0302	67.7	81.2	— 13.5	−16.6	2,055,000	— 343,000	−16.7
1886	2,563,000	57,937,000	.0442	99.0	91.0	8.0	8.8	2,350,000	213,000	9.1
1887	3,339,000	59,217,000	.0564	126.4	102.0	24.4	24.0	2,700,000	639,000	23.7
1888	2,899,000	60,496,000	.0479	107.3	115.0	— 7.7	— 6.7	3,110,000	— 211,000	— 6.8
1889	3,386,000	61,775,000	.0548	122.7	129.0	— 6.3	— 4.9	3,560,000	— 174,000	— 4.9
1890	4,277,000	63,056,000	.0678	151.8	140.7	11.1	7.9	3,960,000	317,000	8.0
1891	3,904,000	64,361,000	.0607	136.0	158.0	— 22.0	−13.9	4,540,000	— 636,000	−14.0
1892	4,928,000	65,666,000	.0751	168.2	172.0	— 3.8	— 2.2	5,040,000	— 112,000	— 2.2
1893	4,020,000	66,970,000	.0600	134.4	189.0	— 54.6	−28.9	5,650,000	— 1,630,000	−28.8
1894	4,412,000	68,275,000	.0647	145.0	207.0	— 62.0	−30.0	6,310,000	— 1,898,000	−30.1
1895	6,115,000	69,580,000	.0879	196.9	225.8	— 28.9	−12.8	7,010,000	— 895,000	−12.8
1896	5,282,000	70,885,000	.0745	166.9	247.0	— 80.1	−32.4	7,820,000	— 2,538,000	−32.5
1897	7,157,000	72,189,000	.0991	221.9	268.0	— 46.1	−17.2	8,640,000	— 1,483,000	−17.2
1898	8,933,000	73,494,000	.1215	272.1	291.0	— 18.9	— 6.5	9,550,000	— 617,000	— 6.5
1899	10,640,000	74,799,000	.1422	318.4	314.0	4.4	1.4	10,480,000	160,000	1.5
1900	10,188,000	76,129,000	.1339	300.0	336.3	— 36.3	−10.8	11,430,000	— 1,242,000	−10.9
1901	13,474,000	77,747,000	.1733	388.0	360.0	28.0	7.8	12,490,000	984,000	7.9
1902	14,947,000	79,365,000	.1883	421.8	386.0	35.8	9.3	13,680,000	1,267,000	9.3
1903	14,535,000	80,983,000	.1795	402.1	412.0	— 9.9	— 2.4	14,900,000	— 365,000	— 2.5
1904	13,860,000	82,601,000	.1678	376.0	438.0	— 62.0	−14.2	16,160,000	— 2,300,000	−14.2
1905	20,024,000	84,219,000	.2378	532.7	464.3	68.4	14.7	17,450,000	2,574,000	14.8
1906	23,398,000	85,837,000	.2725	610.0	490.0	120.0	24.5	18,770,000	4,628,000	24.6
1907	23,363,000	87,455,000	.2671	598.2	516.0	82.2	15.9	20,160,000	3,203,000	15.9
1908	14,023,000	89,073,000	.1575	352.9	542.0	−189.1	−34.9	21,560,000	— 7,537,000	−35.0
1909	23,955,000	90,691,000	.2641	591.8	568.0	23.8	4.2	23,010,000	945,000	4.1
1910	26,095,000	92,267,000	.2829	633.8	594.4	39.4	6.6	24,500,000	1,595,000	6.5
1911	23,676,000	93,682,000	.2528	566.5	620.0	— 53.5	— 8.6	25,940,000	— 2,264,000	— 8.7
1912	31,251,000	95,097,000	.3288	736.5	643.0	93.5	14.6	27,300,000	3,951,000	14.5
1913	31,301,000	96,512,000	.3244	727.0	666.0	61.0	9.2	28,690,000	2,611,000	9.1
1914	23,513,000	97,928,000	.2402	538.0	686.0	−148.0	−21.6	29,980,000	— 6,467,000	−21.6
1915	32,151,000	99,343,000	.3238	725.2	705.7	19.5	2.7	31,280,000	871,000	2.8
1916	42,774,000	100,758,000	.4245	950.9	724.0	226.9	31.3	32,580,000	10,194,000	31.3
1917	45,061,000	102,173,000	.4413	989.0	740.0	249.0	33.7	33,700,000	11,361,000	33.7
1918	44,462,000	103,588,000	.4290	961.0	756.0	205.0	27.1	35,000,000	9,462,000	27.1
1919	34,671,000	105,003,000	.3301	739.2	769.0	— 29.8	— 3.9	36,050,000	— 1,379,000	— 3.8
1920	42,133,000	106,543,000	.3952	885.0	781.0	104.0	13.3	37,100,000	5,033,000	13.6
1921	19,784,000	108,208,000	.1828	409.6	794.0	384.4	−48.4	38,300,000	−18,516,000	−48.4
1922	35,603,000	109,873,000	.3240	725.9	807.0	— 81.1	−10.1	39,600,000	— 3,997,000	−10.1
1923	44,944,000	111,537,000	.4029	902.5	820.0	82.5	10.1	40,800,000	4,144,000	10.2
1924	37,932,000	113,202,000	.3352	751.0	833.0	— 82.0	— 9.8	42,100,000	— 4,168,000	— 9.9
1925	45,394,000	114,867,000	.3951	885.0	846.0	39.0	4.6	43,400,000	1,994,000	4.6
1926	48,294,000	116,532,000	.4142	928.0	859.0	69.0	8.0	44,700,000	3,594,000	8.0
1927	44,935,000	118,197,000	.3804	852.0	872.0	— 20.0	— 2.3	46,000,000	— 1,065,000	— 2.3
1928	51,544,000	119,862,000	.4300	963.2	884.0	79.2	9.0	47,300,000	4,244,000	9.0
1929	56,433,000	121,526,000	.4645	1,040.5	897.0	143.5	16.0	48,600,000	7,833,000	16.1
1930	40,699,000	122,500,000	.3303	739.9	910.0	−170.1	−18.7	49,800,000	— 9,101,000	−18.3
1931	25,946,000	123,600,000	.2090	468.4	923.0	−454.6	−49.2	50,900,000	−24,954,000	−49.0
1932	13,681,000	124,700,000	.1097	245.8	936.0	−690.2	−73.7	52,100,000	−38,419,000	−73.7
1933*	23,450,000	125,700,000	.1865	417.7	949.0	−531.3	−56.0	53,200,000	−29,750,000	−55.9
1934	.....	126,700,000	.....	.....	961.0	.....	.....	54,300,000	.....	.....
1935	.....	127,600,000	.....	.....	974.0	.....	.....	55,500,000	.....	.....
1936	.....	128,500,000	.....	.....	987.0	.....	.....	56,600,000	.....	.....
1937	.....	129,400,000	.....	.....	999.0	.....	.....	57,700,000	.....	.....
1938	.....	130,300,000	.....	.....	1,010.0	.....	.....	58,800,000	.....	.....
1939	.....	131,200,000	.....	.....	1,021.0	.....	.....	59,800,000	.....	.....
1940	.....	132,000,000	.....	.....	1,032.6	.....	.....	60,800,000	.....	.....
1941	.....	132,800,000	.....	.....	1,043.0	.....	.....	61,800,000	.....	.....
1942	.....	133,600,000	.....	.....	1,053.0	.....	.....	62,800,000	.....	.....
1943	.....	134,400,000	.....	.....	1,062.0	.....	.....	63,700,000	.....	.....
1944	.....	135,200,000	.....	.....	1,072.0	.....	.....	64,700,000	.....	.....
1945	.....	135,900,000	.....	.....	1,083.3	.....	.....	65,700,000	.....	.....
1946	.....	136,600,000	.....	.....	1,093.0	.....	.....	66,700,000	.....	.....
1947	.....	137,300,000	.....	.....	1,102.0	.....	.....	67,600,000	.....	.....
1948	.....	138,000,000	.....	.....	1,110.0	.....	.....	68,400,000	.....	.....
1949	.....	138,700,000	.....	.....	1,118.0	.....	.....	69,200,000	.....	.....
1950	.....	139,400,000	.....	.....	1,125.4	.....	.....	70,000,000	.....	.....
1951	.....	140,000,000	.....	.....	1,133.0	.....	.....	70,800,000	.....	.....
1952	.....	140,600,000	.....	.....	1,140.0	.....	.....	71,600,000	.....	.....
1953	.....	141,200,000	.....	.....	1,147.0	.....	.....	72,300,000	.....	.....
1954	.....	141,800,000	.....	.....	1,154.0	.....	.....	73,000,000	.....	.....
1955	.....	142,400,000	.....	.....	1,160.5	.....	.....	73,800,000	.....	.....
1956	.....	143,000,000	.....	.....	1,168.0	.....	.....	74,600,000	.....	.....
1957	.....	143,500,000	.....	.....	1,175.0	.....	.....	75,300,000	.....	.....
1958	.....	144,000,000	.....	.....	1,180.0	.....	.....	75,900,000	.....	.....
1959	.....	144,500,000	.....	.....	1,185.0	.....	.....	76,400,000	.....	.....
1960	.....	145,000,000	.....	.....	1,190.0	.....	.....	77,000,000	.....	.....
1961	.....	145,400,000	.....	.....	1,196.0	.....	.....	77,600,000	.....	.....
1962	.....	145,800,000	.....	.....	1,201.0	.....	.....	78,100,000	.....	.....
1963	.....	146,200,000	.....	.....	1,205.0	.....	.....	78,600,000	.....	.....
1964	.....	146,500,000	.....	.....	1,209.0	.....	.....	79,100,000	.....	.....
1965	.....	146,800,000	.....	.....	1,213.6	.....	.....	79,600,000	.....	.....
1966	.....	147,100,000	.....	.....	1,219.0	.....	.....	80,100,000	.....	.....
1967	.....	147,400,000	.....	.....	1,223.0	.....	.....	80,500,000	.....	.....
1968	.....	147,700,000	.....	.....	1,227.0	.....	.....	80,900,000	.....	.....
1969	.....	147,900,000	.....	.....	1,230.0	.....	.....	81,200,000	.....	.....
1970	.....	148,000,000	.....	.....	1,232.8	.....	.....	81,400,000	.....	.....

* Production estimated by The Iron Age

TABLE X. STEEL INGOTS AND CASTINGS—ACTUAL AND TREND OF PRODUCTION IN POUNDS PER CAPITA, PER CENT DEVIATION OF ACTUAL FROM TREND, FOR DECADES

Decade	Production Pounds Per Capita	Trend Pounds Per Capita	Deviation of Actual from Trend	
			Pounds Per Capita	Per Cent
1870*	3.8	9.9	− 6.1	−61.6
1871-1880	239.3	259.5	− 20.2	− 7.8
1881-1890	949.5	909.9	39.6	4.4
1891-1900	2059.8	2408.1	−348.3	−14.5
1901-1910	4907.3	4770.7	136.6	2.9
1911-1920	7818.3	7090.7	727.6	10.3
1921-1930	8197.6	8522.0	−324.4	− 3.8
1931*	468.4	923.0	−454.6	−49.2
1932*	245.8	936.0	−690.2	− 73.7
1933*	417.7	949.0	−531.3	−56.0
Totals	25307.5	26778.8	−1471.3	− 5.5

*Year only.

steel. It will be noted that the trend lines of production of steel crossed those of pig iron about the year 1909, and since then yearly steel production, both total and in pounds per capita, has been greater than pig iron output.

It will also be noted from the charts (II and III) that the increase in future trend of steel production slows down at a less rapid rate than does that of pig iron.

The material presented in Chart III is given in Table VIII. This table presents also the calculated long-term trends on a tonnage and pound per capita basis. From the percentage deviations shown yearly, a determination can be made of the accuracy of fit of the trends in each year.

For a determination of the accuracy of the "fit" of the trend over the whole term, including an estimate of 1933 output, reference will be made to Table X. Summarizations have already been made of the rates of increase from decade to decade. Population was covered in Table I and Steel Production in Table II.

Table IX indicates the extent to which the increase in the long term trend of volume of production for each decade has progressively decreased, and also indicates the extent of the probable diminishing increase throughout the next four decades as far as 1970. The average annual increase between 1930 and 1940 is estimated at only 1½ per cent. Future decades show a much smaller average annual increment; that of 1960-1970, from present indications, will be less than one-half of one per cent.

Table X is a test of the "fit" of the trend as against actual steel production expressed in pounds per capita. Between 1870 and 1933 the variation was only 5.5 per cent.

In Table XI, actual production in gross tons of steel ingots and castings is compared with the calculated trend values for decades between 1870 and 1933. The deviation of the actual tonnage is only 6.7 per cent from the calculated trend.

This table (No. XI) also compares for successive decades the percentage of increase in volume of production, both actual and for the trend. In future decades ending with 1961-1970, the percentage of increase in the trend becomes progressively smaller. One way to view the dwindling increase in rate would be on an average annual basis of one-tenth the decade increase. This indicates that, from a 2.7 per cent average annual increase which is forecast between 1930-1940, the growth rate will decrease to only 0.76 per cent per year between 1960 and 1970.

Table XII is of interest because it attempts to "spot" the probable trend values in gross tons and pounds per capita of steel ingot and casting production for the decade years. It also shows the percentage of increase of the trend values between the intercepts at the decade years. It does not, of course, indicate actual production in any of these years.

The foregoing surveys of pig iron and steel production point out very conclusively the fact that between 1870 and 1933 the rate of increase has been progressively slowing down. That this decrease in growth rate will continue seems to be a logical conclusion, particularly because:

(1) Per capita demand has gradually diminished;

(2) Replacement demand has become important as compared with demand for new uses;

(3) Population is increasing at a slower rate and is likely to turn downward.

The point involved in this study is not the exemplification of an exercise in statistical method, but an attempt

TABLE XI. PRODUCTION STEEL INGOTS AND CASTINGS—FOR DECADES—IN GROSS TONS

Decade	Actual Gross Tons	Increase Actual Gross Tons	Per Cent	Trend Gross Tons	Increase Trend Gross Tons	Per Cent	Deviation of Actual from Trend	
							Gross Tons	Per Cent
1870*	67,000	.....	.....	171,000	.....	.....	− 104.000	−60.8
1871-1880	5,037,000	.....	.....	5,391,000	.....	.....	− 354,000	− 6.6
1881-1890	24,726,000	19,689,000	391.0	23,745,000	18,354,000	340.9	981,000	4.1
1891-1900	65,579,000	40,853,000	165.1	76,470,000	52,725,000	222.1	−10,891,000	−14.2
1901-1910	187,674,000	122,095,000	186.2	182,680,000	106,210,000	138.8	4,994,000	2.7
1911-1920	350,993,000	163,319,000	87.0	317,620,000	134,940,000	73.8	33,373,000	10.5
1921-1930	425,562,000	74,569,000	21.2	440,600,000	122,980,000	38.7	−15,038,000	− 3.4
1931*	25,946,000	.....	.....	50,900,000	.....	.....	−24,954,000	−49.0
1932*	13,681,000	.....	.....	52,100,000	.....	.....	−38,419,000	−73.7
1933* Est.	23,450,000	.....	.....	53,200,000	.....	.....	−29,750,000	−55.9
Totals	1,122,715,000	.....	.....	1,202,877,000	.....	.....	−80,162,000	− 6.7
1931-1940	.....	.....	.....	559,700,000	159,100,000	27.0	.....	....
1941-1950	.....	.....	.....	660,600,000	100,900,000	18.0	.....	....
1951-1960	.....	.....	.....	740,700,000	80,100,000	12.1	.....	....
1961-1970	.....	.....	.....	797,100,000	56,400,000	7.6	.....	....

* Year only.

TABLE XII. INTERCEPTS AT END OF EACH DECADE—PRODUCTION STEEL INGOTS AND CASTINGS

Decade Ended	Actual Production Gross Tons	Increase		Actual Trend Gross Tons	Increase		Per Capita Trend Gross Tons	Increase	
		Actual Production Gross Tons	Per Cent		Actual Trend Gross Tons	Per Cent		Per Capita Trend Gross Tons	Per Cent
1880	1,247,000	.....	.....	1,053,000	.....	.....	0.0293	.....	.....
1890	4,277,000	3,030,000	242.9	3,960,000	2,907,000	276.4	0.0628	0.0335	114.3
1900	10,188,000	5,911,000	138.2	11,430,000	7,470,000	188.7	0.1501	0.0873	139.0
1910	26,095,000	15,907,000	156.2	24,500,000	13,070,000	114.2	0.2654	0.1153	76.8
1920	42,133,000	16,038,000	61.5	37,100,000	12,600,000	51.4	0.3485	0.0831	31.3
1930	40,699,000	*1,434,000	*3.4	49,800,000	12,700,000	34.2	0.4060	0.0575	16.5
1940	.....	.....	.....	60,800,000	11,000,000	22.1	0.4610	0.0550	13.6
1950	.....	.....	.....	70,000,000	9,200,000	15.1	0.5020	0.0410	8.9
1960	.....	.....	.....	77,000,000	7,000,000	10.0	0.5310	0.0290	5.8
1970	.....	.....	.....	81,400,000	4,400,000	5.7	0.5500	0.0190	3.6

* Decrease

to obtain a long-range view of the future. Having obtained this view which leads to the belief that the steel industry is fast approaching stability, some benefit to the industry may result if present policies are shaped in accordance with the little that to our dim sight can be foreseen.

Methods Used in Calculating the Trends

The yearly pounds, per capita, of pig iron and steel, between 1873 and 1932 were each averaged by groups of five years. The averages were centered at the middle year of each group (i. e., 1873-1877 centered on 1875, etc., and 1928-1932 centered on 1930).

To each of the resulting series of averages were fitted a logarithmic parabola and a Gompertz curve. The results were plotted on arithmetic paper.

Between 1870 and 1917 the logarithmic parabola, in each case, was adopted as the normal trend; between 1936 and 1970 the Gompertz curve was adopted as the long-term forecasting trend. Between 1917 and 1936 the trends were joined by a straight line drawn tangent to the two portions already accepted.

As the trends were plotted against the center year of each five-year group, intermediate values were read off for individual years and irregularities smoothed.

The trends conform to the formulae given below.

Normal trend of production, steel ingots and castings as well as for pig iron 1870-1970, was calculated by multiplying actual population each year between 1870 and 1930 and estimated population between 1931 and 1970 by the normal trend of production per capita.

Yearly production of pig iron and ferroalloys, as well as steel ingots and castings, were obtained in the majority of years from the official publications of the American Iron and Steel Institute and its predecessor, the American Iron and Steel Association.

Formula	Logarithmic Parabola		Gompertz Curve	
	$\log y = a + bx + cx^2$		$\log y = \log a + c^x . \log b$	
	Steel Ingots	Pig Iron	Steel Ingots	Pig Iron
	$a =$ .9973	1.8292	$\log a =$ 3.1194	2.9178
	$b =$ .3533	.1911	$\log b = -1.8176$	−.9134
	$c = -.0164$	−.0093	$\log c =$ .8033	.7968

Progress in Africa's New Steel Works

FINAL stages prior to actual production have now been reached at the new plant of the Iron and Steel Industrial Corpn., Ltd., at Pretoria West in the Transvaal, according to a report to the Commerce Department from Commercial Attache Samuel H. Day.

The coke ovens have already been fired and the first coke was to be produced about Feb. 1, the report states. Fires have also been lighted in the blast furnaces, which are slowly being brought up to maximum temperature. Train loads of ore from the corporation's iron mine at Thabazimbe are arriving at the steel works daily.

Along with the production of its first coke, the new steel plant will produce its first series of by-products, including benzol, tar, ammonia and naphthalene.

It is expected that South Africa's new industrial undertaking will turn out its first actual steel about the end of March, according to the report. When in full operation the works will employ about 1200 men, the majority of whom have already arrived.

German Rolling Mill Production Increases

GERMAN rolling mill production during 1933 increased by about 29 per cent compared with the preceding year, according to a report from vice consul J. H. Wright, Cologne, made public by the Commerce Department.

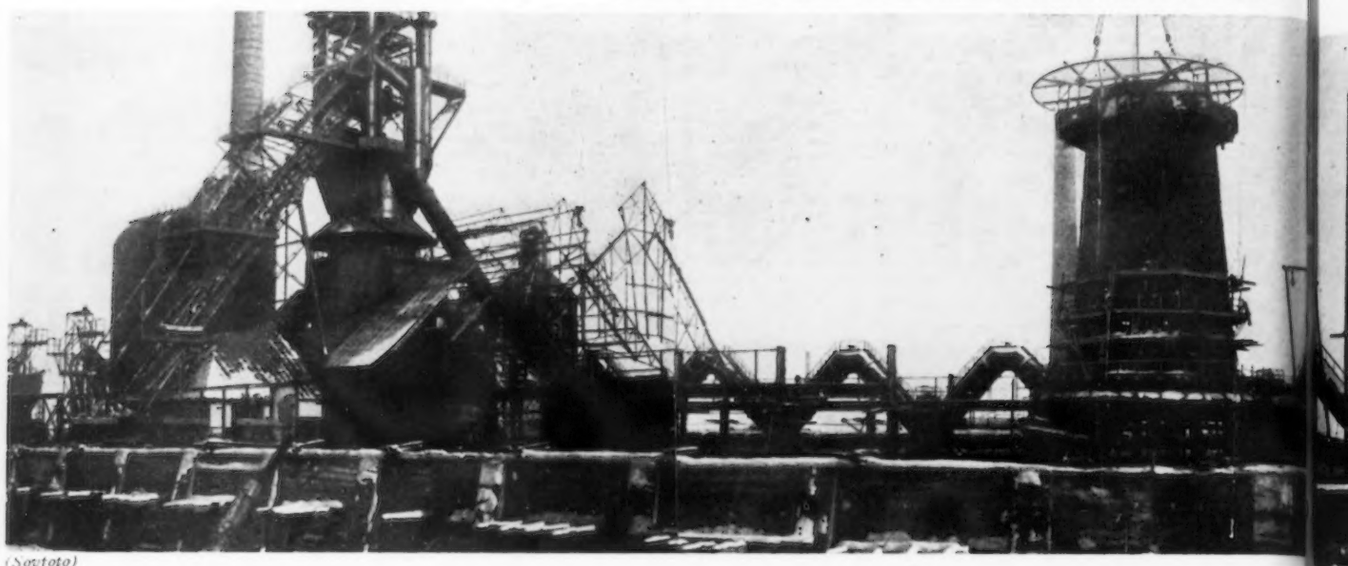
Total sales of finished products during 1933 amounted to 5,463,233 metric tons, while semi-manufactures for sale, amounting to 543,138 metric tons, brought the year's total to 6,006,371 metric tons. The aggregate total in 1932 was 4,552,848 metric tons.

With the exception of slight decreases in the production of universal iron and medium plate, all principal groups of production registered increases in 1933 compared with 1932, the report points out.

German rolling mill production in December, 1933, was 47 per cent higher than that for December, 1932. Output of finished and semi-manufactured products during December, 1933, totaled 576,485 metric tons compared with 390,355 metric tons in December, 1932.

Outstanding increases in rolling mill production during 1933, the report shows, occurred in the case of "railway superstructure material," "shapes over 80 millimeters in height and universal iron," "rods and small shapes," "hoop iron," "rolled wire," and "tubes."

Panorama of furnaces at Vorogshiloff. No. 1 furnace at left and No. 2 furnace



(Sovfoto)

Soviet Standardizes

DEVELOPMENT of the steel industry in the Soviet Union required construction of a number of blast furnaces which, designed and built on a "mass-production" basis, substantially as duplicates of each other, offered attractive possibilities for economies. These economies were even more important under Russian than under American conditions. Government ownership and centralized control made possible the avoidance of "individuality" in designs. It was considered possible to design a standard or typical blast furnace which might be adapted, by slight changes, to differences of site conditions, raw materials and product.

THE program for construction is best indicated in the accompanying table. With the exception of Lipetsk and Tula, all of these furnaces are located at existing or projected steel works of considerable magnitude, which are now under construction. For the time being, the furnaces at Lipetsk and Tula will be of the nature of merchant furnaces.

The Gipromez standard blast furnace is nominally a 1000-ton unit. While the standard blast furnace is nominally rated at 1000 tons, the determining elements have sufficient marginal capacity to permit possible outputs of perhaps 1200 tons at a later date when favorable operating conditions have been organized. The more prominent factors which led to the choice of this size were as given in the following paragraphs.

1. A modern furnace was required, having the advantages of low construction and operation costs per unit output which accrue to large units. The 1000-ton unit was considered to be the maximum sufficiently well established by contemporary practice elsewhere.

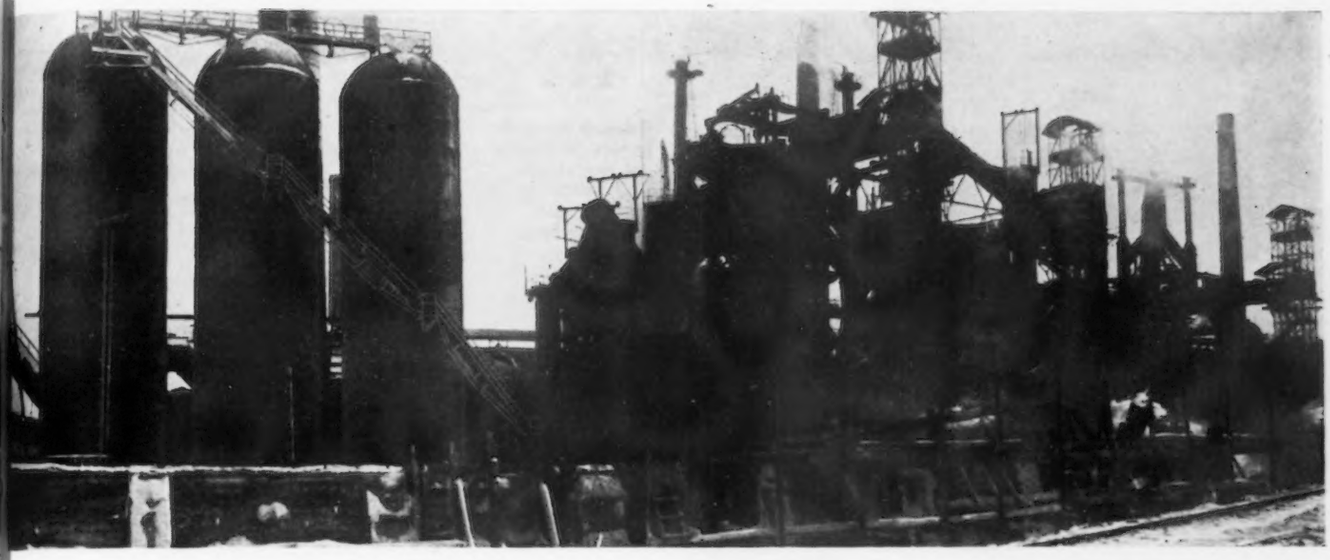
2. The conditions which will attend the operation of these furnaces, at least initially, did not justify the adoption of extremes. Most of the furnaces are located in entirely new plants in which operating personnel must be organized and trained. Available transportation equipment does not favor large tonnage operations. Maintenance facilities must be developed. Initially, at least, more than normal delays may be expected.

3. Flexibility was desired to permit adaptation both as to ores and as

(Sovfoto)

Two "standard" furnaces at Azovstal.

at center are of the "standard" type. At extreme right is the old furnace plant.



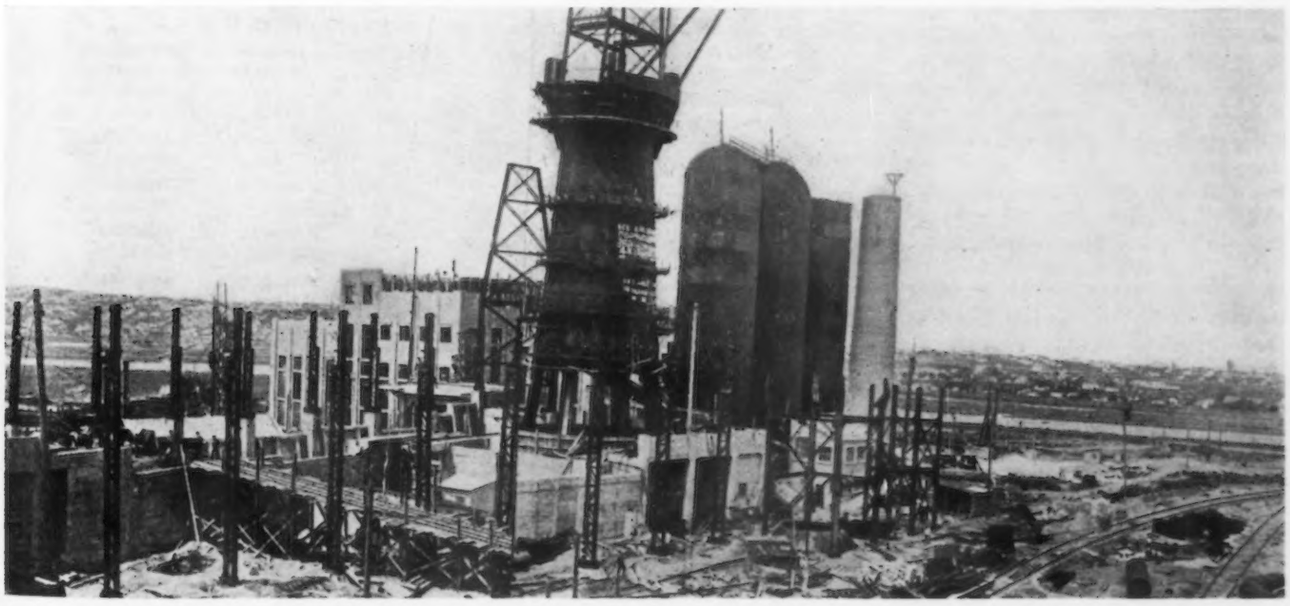
Blast Furnace Design

By GORDON FOX and OWEN R. RICE
Vice-President, Freyn Engineering Co. — Metallurgical Engineer, Freyn Engineering Co.

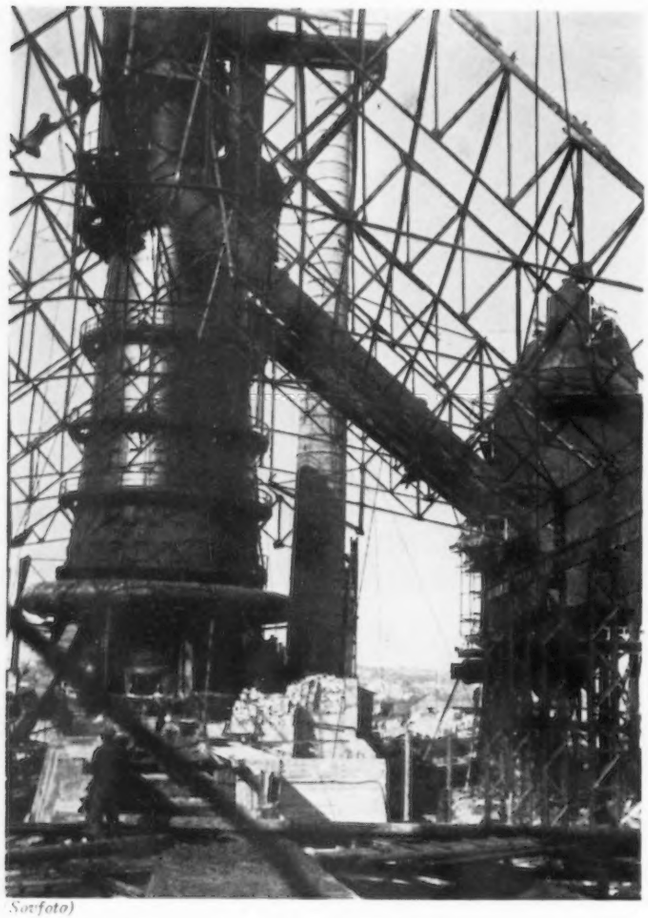
to product. The characteristics of the ores available for burdening through the life of the furnaces were in some cases rather indefinite. In no case was there experience as to previous performance of these ores in large furnaces.

4. Studies involving all factors indicated that in plants of medium size, where most of the standard blast furnaces will be located, three or four moderate sized units have many practical advantages in providing a plant metal balance in continuity of material movements, minimizing of coal, coke and pig iron stocking, and insurance of uniformity in gas supply. These factors are of particular importance in most of the new Russian plants where about 70 per cent of the open-hearth charge will be hot metal and where blast furnace and coke-oven gas are to be the prime source of heat for mill operations.

The brick lines for the standard blast furnace were developed particularly with ores from the Krivoirog district in mind. A number of the new furnaces will use Krivoirog hematites, which are similar in general character to our Lake Superior ores. Most of the new furnaces are based on using coke produced from the Don



The furnace at right is now in operation.



Close-up of No. 1 furnace at Azovstal now in operation.

(Sovfoto)

Bas coal, which is now and probably will continue to be high in sulphur (about 1.75 per cent). Russian furnace operation in this district will be committed to high slag volumes.

Principal dimensions of the standard blast furnace with a typical lining will be as tabulated on page 23.

In the standard arrangement for a blast furnace department comprising several blast furnaces, the furnaces and cast houses are in line, with the stoves and tracks parallel thereto. Except for end furnaces, adjacent furnaces have a common cast house and common stove block. Three tracks are provided under the skip inclines on the cinder side. Slag can be hauled in either direction from the spotting points. Iron ladles are spotted on stub tracks under the cast house floor, arranged either right or left hand, according to the location of the steel works. Stub tracks also serve the dust catcher. Three tracks are provided on this side of the furnace. Where more than six furnaces will be in line, cross-over tracks will be provided between the sixth and seventh furnaces.

Economies of Straight-Line Arrangement

The straight-line arrangement of blast furnaces shows both investment and operating economies over the angular arrangement. It accommodates well the slag granulating system. It is less convenient during construction or repair of one furnace with others in operation. Russian conditions strongly influenced the adoption of the straight-line arrangement. Due to the relatively wide track gage and the extensive use of four-wheel type cars with rigid axles, large radius track curves are essential. The angular arrangement of cast houses, involving much curved track, occupies larger areas. Moreover, a four-furnace layout with angular cast houses requires more track switches than an equivalent straight-line arrangement. The maintenance of the additional trackage under severe weather conditions is a factor of some import.

Many of the iron ores of the Soviet Union require concentration, notably those of Kertch, Tagil, Bakal and Lipetsk. Sintering plants have, therefore, assumed large proportions. Decision was reached to divide ores into three classes as to size. These are 0-5 mm., 5-30 mm. and 30-80 mm. All ores falling into the 0-5 mm. class are to be sintered, together with flue dust and mill scale. The other two sizes are to be charged separately.

Ore Sizing and Sintering

The Russian Ore Congress adopted the policy of locating ore sizing and sintering plants at the blast furnace plants rather than at the mines (excepting Kertch ores). This policy complicates the ore-handling problem by requiring in the ore yard the storage both of raw ore for the ore-conditioning plant and graded and sintered ore for the furnaces. At most seasons a simultaneous flow of material both into and out of the ore yard is involved. In addition there is a fluctuating traffic of raw ore direct

LOCATION OF STANDARD BLAST FURNACES IN U. S. S. R.

Name of Plant	Location	Number of Furnaces: Operating	Bldg.	Projected	Location of Materials and Distance From Furnace: Ore	Coal
Dzerjinsky	Ukraine, on Dnieper River	1	1	5	Krivoirog 125 km.	Don Bas 250 km.
Zaporozhe	Ukraine, on Dnieper River	1	1	4 or 6	Krivoirog 25 km.	Don Bas 250 km.
Voroshiloff	Ukraine, Don Bas	1	1	4	Krivoirog 375 km.	Don Bas Local
Azovstal	Sea of Azov	1	1	6	Kertch 100 km.	Don Bas 125 km.
Lipetsk	Central	0	2	4	Lipetsk Local	Don Bas 200 km.
Tula	Central	0	2	4	Tula Local	Don Bas 375 km.
Krivoirog	Ukraine, Southwest	1	1	6	Krivoirog Local	Don Bas 375 km.
Nikopol	Ukraine, Southwest	0	0	2 or 3	Krivoirog Local	Don Bas 375 km.
Tagil	North Urals	0	0	6	No. Ural District	Kuznetsk 1500 km.
		—	—	—	Adjacent	Kisel Adjacent
		5	9	41		

to the conditioning plant, and of conditioned ore direct to the furnace.

Ore handling is predicated upon rail transport from mines to furnaces, except for Azovstal which will receive ore by water transport from the concentrating and sintering plant at Kertch. A gradual replacement of the present conglomeration of cars (15-ton, four wheel, flat-bottom, wooden gondolas, box cars, 25-ton hopper bottoms with side discharge, and occasional 60-ton American type steel hopper cars) with a standardized 60-ton car is contemplated. This car will be suitable for car-dumper unloading, an operation now generally impossible. Accordingly initial arrangements are for hand unloading to storage with provision for car dumpers as a future possibility.

Two concrete track trestles under the ore bridge discharge to a common trough between them. The length of the trestles and trough conforms to the length of the furnace stock bins. The total unloading track length allows 4 hr. per shift of cars for hand unloading, sufficient to meet current furnace consumption and to develop a 75-day reserve. This reserve is based on anticipated retardation of rail traffic in winter.

To provide for raw ore from storage to conditioning plant, two reloading tracks are arranged outside the shear leg of the ore bridge under the cantilever. Liberal ore bridge capacity is required. Two bridges are indicated for a two-furnace plant and three for a four-furnace plant. The design adopted has a span of 76 m. (250 ft.) with cantilever 16.5 m. (54.0 ft.) on the furnace side and cantilever 18 m. (59 ft.) on the unloading and reloading side. The bridge has a 10-ton man-trolley with free stocking capacity of 550 tons per hour. The height of the bridge permits 17 m. (56 ft.) ore piles.

DIMENSIONS OF STANDARD BLAST FURNACE

	Meters	
Hearth diameter	7.000	23 ft. 0 in.
Bosh diameter	7.850	25 ft. 9 in.
Stockline diameter	5.410	17 ft. 9 in.
Height:		
Bottom to iron notch	0.507	1 ft. 8 in.
Iron notch to cinder notch	1.420	4 ft. 8 in.
Cinder notch to tuyeres	1.120	3 ft. 8 in.
Tuyeres to bosh	0.507	1 ft. 8 in.
Bosh	3.240	10 ft. 8½ in.
Straight section (bosh)	1.860	6 ft. 1 in.
Inwall	14.720	48 ft. 4 in.
Straight section to open bell	2.920	9 ft. 7 in.
Open bell to platform	2.740	9 ft. 0 in.
Total height bottom to platform	29.034	95 ft. 4½ in.
Bosh angle	82° 31′ 37″	
Inwall batter	0.0823 per 1.0 m.	1 in. per ft.
Bell diameter	3.960	13 ft. 0 in.
Bell slope	50°	
Bell clearance	0.725	2 ft. 4½ in.
Furnace volume	930 cu. m.	32,800 cu. ft.

8 columns, 12 tuyeres.

Ore Storage

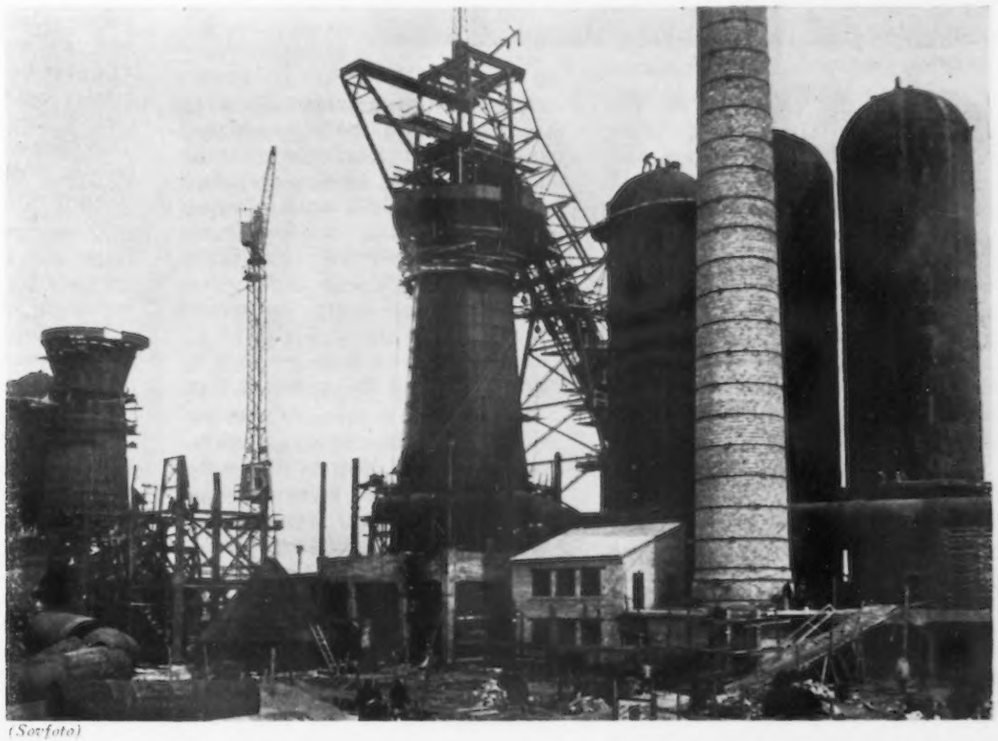
The normal ore storage for a four-furnace plant is 525,000 tons, plus 36,000 tons of limestone. This is a 75-day ore reserve. The furnace stock bins are arranged in a double line. Designs were made both for steel and for reinforced concrete bins. The latter type were used at the initial plants due to stringency of steel. There are 26 bins per furnace, each bin having 106 cu. m. (3740 cu. ft.) effective capacity. They are conventionally allocated as follows:

Ore	14 bins—3,556 tons, 48-hr. supply
Limestone	6 bins—1,020 tons, 40 hr. supply
Scrap	1 bin
Miscellaneous	4 bins
Empty	1 bin

Freyn-design bin gates of the Orr roller type are provided. These are operated from the scale car. This type of mechanical gate was adopted as the fastest and most accurate means of loading the scale car.

Coke is handled in two central coke bins of 646 cu. m. (22,800 cu. ft.) combined capacity. There is storage for 310 tons of coke, about 8 hr. supply. The bins and trestle carry three tracks. The ore-transfer-car track and the coke track are electrified. The track above the stone, scrap and miscellaneous bins is not electrified. The stock house is totally inclosed with brick walls, with windows and openings provided for ventilation. Initially, at least, coke salamanders will be used for heating.

A two-compartment Atlas type scale car is provided, having 4.5 cu. m. (160 cu. ft.) capacity in each compartment. A scale car repair pit is used at the end of the stock house.



Blast Furnace "Komsomolka" at Krivoirog.

(Sovfoto)

Inclined trackage permits movement of any scale car to yard level, and a lay-off spur track permits placing any scale car over the stock-house repair pit.

Charging Arrangements

The arrangements for charging the standard blast furnace are in full conformity with the most modern American practice. The charging cycle is based upon the following volumetric capacities:

Skip hoist tub	6 cu. m. (212 cu. ft.)
Hopper above small bell	6.45 cu. m. (227 cu. ft.)
Hopper above large bell	21 cu. m. (740 cu. ft.)

The skip tub volume is somewhat larger than is normal to American furnaces of this size. On the one hand, this skip volume affords satisfactory depth of a coke round comprising either two or three skips. On the other hand, it permits ample charging capacity with a minimum number of rounds per day. Such a charging program gives a maximum of leisure for scale car operations and permits moderate operating speeds of all charging mechanisms, minimizing their first cost and avoiding the troubles caused by impact stresses associated with high speeds.

Automatic Weighing of Coke

Provision is made for automatic weighing of the coke charge. The coke passes from the central coke bin over rotating grizzles to either of two weigh-hoppers, thence to the skips. The arrangement is such that no operator need be present during the coke-charging operation. The desired number of skip-loads of coke are weighed and sent to the furnace automatically. This arrangement affords to the scale-car operator ample time to load ore, stone, etc., while the coke rounds are being charged.

The skip tubs are of bail type. The skip hoist is a single-drum machine, conforming to American design and equipped with two Russian mill-type motors of 125-kw. continuous capacity at 220 volts d.c. Series-parallel magnetic control is provided. The free-running speed is about 1.8 m. per sec. (350 ft. per min.). This arrangement permits the use of substantially standard motors and magnetic contactors of the largest size yet developed in the Soviet Union.

(Sovfoto)

▲ ▲ ▲

One of two "standard" blast furnaces under construction at Lipetsk.

▼ ▼ ▼

Bell hoists are pneumatically operated. The air for their operation is normally taken from the cold-blast line, but provision is made for emergency supply from a small reservoir in the hoist house. A motor-driven compressor is provided, duplicating those used on the scale car and ore bridge. The revolving top control provides for six positions with an adjustable number of skips per position. The control is of the reversing type.

Each furnace is provided with two Freyn-Design Continuous Stockline Recorders which indicate the movement of the burden at two opposed points. The charging operations are fully interlocked and sequenced through the use of a Freyn-Design Charging Control.

Provision is made for spotting three iron ladles at each furnace. Three slag ladles of 11 cu. m. (390 cu. ft.) are provided, also one additional ladle common to two furnaces. This suffices for 1000 tons daily iron production and 60 per cent slag volume. The slag granulating system approximately doubles this slag disposal facility. Iron ladles are of 80 tons capacity. Both open-top and Kling type ladles are in use at different plants. The possible adoption of a standard type will depend upon operating results.

Handling Granulated Slag

Granulated slag is flushed down a flume common to a number of furnaces, and accumulates in a pit sufficiently remote from the furnace site to prevent traffic congestion. This expedient segregates under central control the difficulties incident to the handling of wet granulated slag in cold weather. The pit will hold 12-hr. accumulation of slag. It is spanned by a gantry crane having a 4 cu. m. (5 cu. yd.) grab bucket. For a four-furnace plant, reloading facilities at the slag pit have a capacity of 2400 tons of granulated slag per day. Two loading tracks, served with an electric car haul, provide for spotting 16 cars. Slag in ladles can be granulated at the pit, provision being made for spotting seven ladles.

Flushing Water Recirculated

Because of the scarcity and cost of water at most Russian plants, provision is made for recirculation of flushing water. There is a system of weirs both in the slag pit and in a separate sump whereby the water is freed from the granulate. The water supplied for granulation approximately offsets the loss in evaporation and the moisture in the granulate. The granulated slag will be hauled in cars to cement plants, which will be located near the blast furnace plants. Thaw houses are contemplated at the cement plants in view of probable freezing difficulties.

Three stoves, 7.8 m. dia. x 30.5 m. height (25 ft. x 97 ft.) are provided for each blast furnace. Space is reserved for the possible future construction of a seventh stove common to two furnaces. Checker work was selected so that brick could be reliably manufactured under present conditions by Russian refractory plants. The Kuehn type of checker with straight brick is employed. The stop section of checkers has openings 110 mm. (4.3 in.) square with 60 mm. (2.4 in.) thick brick; the intermediate zone has 45 mm. x 117 mm. opening (1.8 in. x 4.5 in.) with 45 mm. (1.8 in.) brick; the bottom zone has 45 mm. openings with a special cross

(*Concluded on Page* 58)

The Significance of Equilibrium Diagrams

THE large number of equilibrium diagrams appearing in current metallurgical literature reflects a tendency to consider treatments and developments of steels and other alloys in a more analytical manner. Unfortunately, many find these diagrams difficult to understand because of unfamiliarity with the underlying principles involved. It is the purpose of this discussion to simplify the elements of equilibrium diagrams by reviewing the basic theory, and by showing the close relationships among the individual diagrams.

In order that there be no ambiguity about such necessary terms as "phase," "degree of freedom," "equilibrium," etc., they will be defined immediately. Since the interest is primarily in metals, it is justifiable to simplify the definitions more than is permissible in basic thermodynamics, to which science the theory of heterogeneous equilibrium belongs.

Any pure metal or alloy may be defined as a *system*, and if it is an alloy its constituent pure metals are called *components*. The *state* of a system is literally its mode of existence. This term may be explained by means of a geometric figure such as a triangle. A triangle consists of three angles and three sides, and it is evident that the angles determine its *shape* and the sides determine its size. The state of the triangle is its shape, and a triangle of a given shape is in a definite state. It is to be noted that there is a fundamental difference between the angles and the sides. A 30-deg. angle is a 30-deg. angle whether its sides are an inch or a mile long, but the sides are, however, additive.

For the above reason, properties independent of amount, such as angles, are called *intensive*, and properties dependent upon amount, such as sides, are called *extensive*. Thus, only the intensive properties determine the state of a system. It is not always necessary, however, to measure every intensive factor in order to be able to determine the state of the system. If it were desired to reproduce a triangle it would not be necessary to measure all three angles as the sum of the three angles is 180 deg. Thus, the maximum number of angle measurements required is two. If the value of only one angle is known, one is unfixed, and its value may be anything, over a wide range.

A RATIONAL understanding of alloy systems is directly dependent on a concomitant understanding of equilibrium diagrams. Skillful analyses of binary systems have resulted in a great enrichment to industry through materials development, and there is a growing tendency to attack the more complex systems in a like manner. Although commercial alloys are seldom in the equilibrium condition, only knowledge of constitution in the completely stable condition permits intermediate points to be envisaged. The accompanying exposition is a unique supplement to the usual diagrammatic illustration of the theory of heterogeneous equilibrium, and is a broad abstract of a paper recently presented by Mr. J. S. Marsh before the New York Chapter of the American Society for Metals.

The system is said, therefore, to possess one *degree of freedom*. In the sense of an unfixed variable, a degree of freedom is, therefore, defined.

Certain Intensity Factors

The intensity factors considered in the theory of heterogeneous equilibrium are pressure, temperature and "chemical potentials," the last named being characteristic of the metals involved. To understand the term "heterogeneous equilibrium" it is advisable to examine the pressure-temperature diagram of the system H_2O. At certain low pressures and temperatures ice is capable of coexisting with its vapor, and the vapor pressure has a definite value corresponding to each definite temperature. Water and vapor likewise can coexist, and at one point ice, water and vapor can coexist in equilibrium. Ice, water and vapor constitute three distinct phases, and to be in equilibrium each phase must be in a definite state, and each intensity factor must have the same value in each phase. If, for example, the vapor-pressure values were not the same, phases of higher vapor pressure would disappear by a process of isothermic distillation. Heterogeneous, then, means consisting of at least two phases, and equilibrium means equality of the respective intensity factors.

It is advisable now to consider the well known phase rule which does not, however, "rule" heterogeneous equilibrium, but is true because of the *nature* of heterogeneous equilibrium. In brief, the phase rule is an aid to correct thinking, because it is a concise statement of the relation among the phases, the components, and the degrees of freedom of a system. The maximum number of phases which may coexist in equilibrium is equal to the number of intensive factors, which are pressure, temperature and the chemical potentials, for which may be substituted the number of components. Thus the maximum number of coexisting phases = pressure + temperature + number of components, or maximum number of phases = n + 2. If one variable is unfixed (i.e., there is one degree of freedom) the number of phases is diminished by one, which may be expressed mathematically as

$$F = n + 2 - P$$

It must be emphasized that this rule applies *only* to phases in equilibrium. A change of phase necessarily requires finite time, and, in most metallic systems at a low temperature, and after an exceedingly long time.

Because the pressure variable is usually negligible in metallic systems,

the phase rule may be ordinarily, *but not always*, stated as $F = n + 1 - P$. But it must be remembered that the diagrams of metallic systems of literature are assumed to be isobaric sections of the total diagram.

Typical Binary Sections

The discussion can now proceed to an examination of some typical binary isobaric sections, repeating, however, several points already expressed explicitly or implicitly:

(1) The theory of heterogeneous equilibrium does not distinguish solids, liquids, or gases. The treatment of a polymorphic transformation (as alpha to gamma iron) is the same as that of a solid-to-liquid transformation. Thus, upon attaining the temperature of the A_3 transformation of iron, alpha iron may be considered to be saturated with gamma iron. Further, melting and dissolution are synonymous, as are freezing and precipitation.

(2) Only systems in equilibrium are being considered.

(3) The diagrams are really state diagrams, i.e. each point within a phase region represents a definite state.

For convenience, even though the kind of transformation is of no importance, the diagrams may be described in terms of liquid and solid phases. As a further convenience, the systems may be classified according to the degree of intersolubility existing above and below the temperatures of the liquid-solid transformation:

I. Complete intersolubility at temperatures above and below those of the transformation.

II. Complete intersolubility at temperatures above and incomplete intersolubility at temperatures below those of the transformation.

III. Incomplete intersolubility at temperatures above and complete intersolubility at temperatures below those of the transformation.

IV. Incomplete intersolubility at temperatures above and below those of the transformation.

Of the above, classes I, II and IV are common among metallic systems.

The simplest possible binary isobaric section is one with no lines at all, and this would result if two metals A and B are completely intersoluble and if no transformation occurs over the temperature range considered. The next simplest section consists of a single horizontal line extending from the transformation point of component A to the transformation temperature of component B, and every solution of the series transforms as if it were a pure substance. It might be added that such behavior is realized by solutions composed of the two optically active oximes of camphor, as shown in Fig. 1. It follows that these substances are thermodynamically indistinguishable. If, however, components A and B are not identical but not very dissimilar, two transformation curves exist, which inclose the familiar lenticular two-phase regions, and which decline regularly from the transformation point of one component to the transformation point of the other, as in Fig. 2.

The next step marks the transition from Class I to Class II. If the dissimilarity of A and B is somewhat greater, this is reflected by a "kink" in the transformation curves, shown in Fig. 3. This kink is a signal to inspect for a solubility gap at lower temperatures. In considering a diagram belonging to Class II where the transformation curves pass through a temperature minimum, it is seen that the curves possess a common horizontal tangent. Intersolubility is incomplete in the solid state as is shown by the paraboloid solubility gap, and at the temperature maximum of the gap (the critical point) the tangent is also horizontal. Assuming successive increases of the area of the gap, together with concomitant increases of the temperature of the critical point, the maximum point of the gap and the minimum point of the liquid-solid curves approach until they coincide. This point represents three-phase equilibrium, although the two solid phases are identical, as in Fig. 4. If the area of the gap is further increased, it is to be seen that the point has split into three points all having the same temperature values. This, therefore, illustrates the familiar eutectic type, and it is evident that the "eutectic horizontal" is not a phase boundary but a line connecting the three points of twofold saturation. These points, of course, represent the compositions of the three phases which participate in the non-variant equilibrium.

One component can now be substituted by others of successively lower transformation temperatures, but the temperature of non-variant equilibrium is maintained unchanged. The diagram representing the first substitution shows that the new transformation curves have approached the horizontal. This approach continues upon further substitution until finally, when the transformation temperature of the new component is the same as the temperature of non-variant equilibrium, the two curves coincide and appear as a single horizontal line. The next substitution necessarily causes the new transformation curves to extend up to the temperature of non-variant equilibrium; the result is clearly the peritectic type of diagram. Thus, in a manner of speaking, the peritectic type is merely a temperature inversion of the eutectic type.

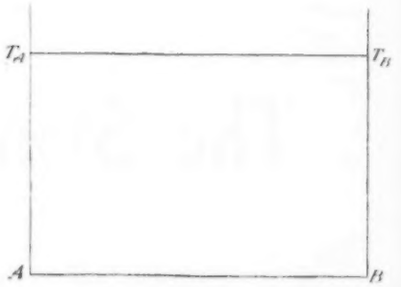


Fig. 1—Schematic section typical of solutions such as the optically active oximes of camphor.

These two diagrams are worthy of further examination, because they contain the key to a very useful means of classifying multicomponent systems in which non-variant equlibria exist. It is to be seen that the eutectic type is characterized by two two-phase regions above, and one two-phase region below, the non-variant equilibrium. The arrangement of two-phase regions for the peritectic type is just the opposite. This difference of distribution of polyphase regions above and below the non-variant equilibrium is equally characteristic of the multicomponent systems in which other—and almost unnamed—kinds of non-variant equilibria exist.

Class III may be visualized by inverting the diagrams illustrating Class II. Class IV, which means solubility gaps in the liquid state, now presents no difficulty. Typical diagrams may be deduced in the identical manner followed for Class II. When it is realized that the only difference between a Class IV diagram identical in appearance to the eutectic type of Class II is that two liquid phases instead of two solid phases participate in a three-phase non-variant equilibrium, any possible peculiarity disappears. So with the others.

Nothing has been said as yet about intermediate compounds, but little need be said. If a stable compound *A B* exists in the system *A-B*, it is quite logical to divide the total system into two partials; i.e., *A-AB* and *AB-B*.

The more complex diagrams of

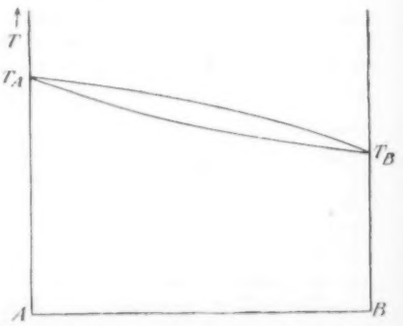


Fig. 2—Section illustrating the lenticular two-phase region.

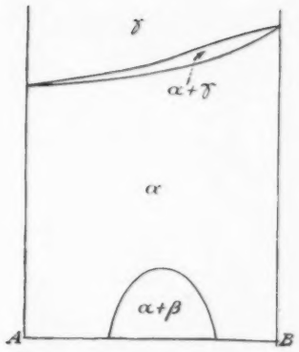


Fig. 3—Schematic section illustrating the influence of diminished intersolubility.

some metallic systems are merely various combinations of features of the simple diagrams, of which a few have been discussed. That this is true may be shown by examination of the six typical ferrous binary systems. These may be classified as follows:

I. The alloying element increases the temperature of the A_4 transformation and decreases the temperature of the A_3 transformation.

a. The degree of intersolubility is high.
b. The degree of intersolubility is low.

II. The alloying element decreases the temperature of the A_4 transformation and increases the temperature of the A_3 transformation.

a. The degree of intersolubility is high.
b. The degree of intersolubility is low.

III. The alloying element decreases the temperature of the A_4 transformation and of the A_3 transformation.

a. The degree of intersolubility is high.
b. The degree of intersolubility is low.

Reference to real systems indicates the adequancy of this classification:

Ia. Fe-Ni; Fe-Mn
Ib. Fe-C; Fe-Cu
IIa. "Loop" systems: Fe-Si; Fe-P
IIb. Fe-B
IIIa. Fe-Cr
IIIb. Fe-Zr

Inspection of the diagrams of these systems, as suggested before, shows them to consist of various combinations of the simple diagrams.

The ternary diagrams, although more difficult to grasp, contain no new principles of heterogeneous equilibrium. It is hoped that this discussion has helped to show that interpretation of the many ferrous-system diagrams is not particularly difficult if once the basic meanings are considered.

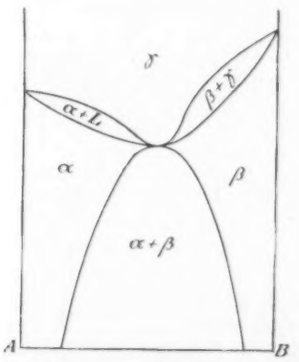


Fig. 4—Schematic section illustrating coincidence of the maximum and minimum points. Infinitesimally less intersolubility results in the eutectic type section.

Troubles with Piercing Alloy Steels Charged to Oxygen

SOME years ago, in the manufacture of seamless tubing from an alloy steel containing 0.07 per cent maximum carbon, 18 per cent chromium and 8 per cent nickel, at the plant of the Babcock & Wilcox Tube Co., a peculiar type of piercing defect was noticed. This defect was definitely associated with certain heats of the alloy and was independent of any of the variables of mill operation and billet-heating condition. A thorough analysis of the defective material yielded but one clue to the reason for its abnormal behavior in piercing and that was its oxygen content as determined by the vacuum fusion method.

The oxygen content of the defective 18-8 alloy was found to be two to three times that of the material that had pierced satisfactorily. This fact incited an active interest in the vacuum fusion method for the analysis of alloy steels and an apparatus and technique were evolved that gave a fairly rapid, simple and reliable method of analysis. Newell Hamilton, research metallurgist of the Babcock & Wilcox Co., at Beaver Falls, Pa., described the apparatus, the methods of use and the results in a paper presented to the annual meeting of the American Institute of Mining and Metallurgical Engineers.

Some six years of tube-production records were available for the investigation of the effect of oxygen, all with histories definitely known. The defect that occurred in the heats that were selected was called "outside checking," and consisted of outside transverse cracks originating in the piercing mill. After plug rolling these cracks opened and varied in depth from a few thousandths of an inch to ruptures entirely through the wall of a heavy-walled tube. The defect has been analyzed as a lack of high-temperature ductility in the metal.

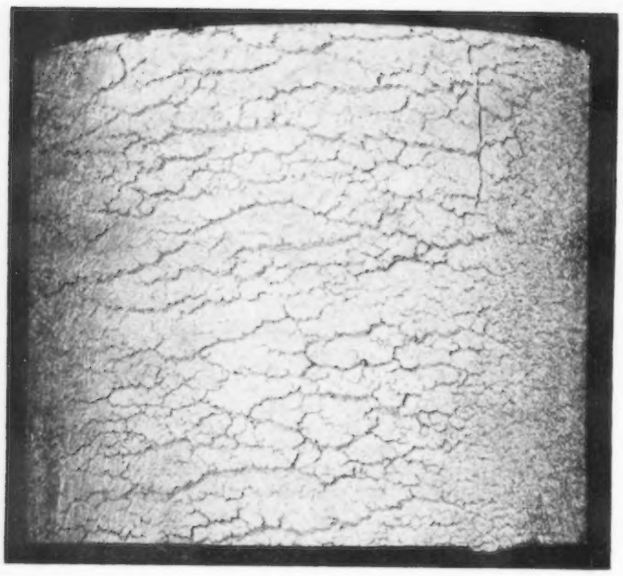
The samples selected for vacuum fusion analysis were cut from either billets or tubes, so that the same ratio of core and rim was maintained in all cases. Nitrogen determinations were made on these heats by the distillation method. The usual chemistry of these heats was well within the commercial range for this alloy and no correlation was found between the outside checking and the carbon, manganese, sulphur, phosphorus, silicon, chromium, nickel or iron contents of the heats.

A number of heats of an alloy steel containing 5 per cent chromium, 0.50 per cent molybdenum and 0.16 per cent carbon maximum was also studied, steels that developed a bad surface condition, which apparently had originated in the piercing mill. The final form of the defect was more in a longitudinal direction than in a transverse direction but it had a close resemblance to the external checking that had occurred on the 18-8. A number of these heats, as well as some that had processed satisfactorily, were analyzed by the vacuum fusion method. The results showed that practically the same difference exists between the oxygen values of the good heats and those exhibiting the outside checking, as in the 18-8 results.

Oxygen May be Combined with Chromium

The results of the investigation indicate, Mr. Hamilton suggests, that the total oxygen content of two highly alloyed steels bears a direct relationship to the elevated temperature ductility of these steels as determined by the seamless tube piercing. "Any theoretical consideration of this problem," he says, "brings up the question of the manner of combination of oxygen in these steels that causes this change in their ductility. Both of the alloys investigated contain appreciable amounts of chromium, and, owing to the great activity of this element, it is probable that the oxygen present is in combination with it. The amounts of inclusions present in these steels at room temperature are not excessive and could not possibly affect the workability of the steel if they were to remain unchanged when heated to the temperatures required for piercing, which are from 2150 to 2350 deg. F. (1177 to 1288 deg. C.). This suggests the formation of an oxygen-bearing constituent at elevated temperatures, which would have physical properties differing from the alloy matrix at these temperatures and would be of sufficient volume to cause the pronounced effect upon the elevated-temperature ductility of the alloy that has been noted. Efforts to prove the existence of such a constituent by microscopic examination at room temperature have as yet been unsuccessful.

That some combination of oxygen and chromium is responsible for the abnormal behavior of these steels at



A case of heavy checking with 18-8 alloy, comprising outside transverse cracks originating in the piercing mill.

elevated temperatures is indicated by the fact that heats of 18-8 alloy that have been subjected to ladle deoxidization with aluminum or zirconium have been successfully pierced even though their total oxygen content has been above the maximum for good piercing quality. This is explained by the supposition that the oxygen in these heats has been "fixed" to a more stable form by combination with aluminum or zirconium so that it does not affect the elevated temperature ductility. Such "fixing" of the oxygen content of a heat of 18-8 is not a satisfactory solution to this problem, for it has been found that the resulting inclusions seriously interfere with the working of the alloy in other ways, to form numerous splits and tears in hot working that become exaggerated in cold drawing. The fact remains that oxygen in 18-8 and other high-chromium alloys, regardless of its combination, is detrimental to the manufacture of tubes and all efforts should be made to keep it at a minimum. It is realized that this minimum is low (less than 0.01 per cent oxygen), but experience has shown that many thousands of tons of these materials have been made that have contained less than this minimum of oxygen.

The author wishes to express his appreciation to the officials of the Babcock & Wilcox Tube Co. for permission to publish the material contained in this paper. Special credit is deserved by W. Spencer Lloyd for the work on the development and operation of the vacuum fusion apparatus. The helpful suggestions of H. D. Newell and the aid of James F. Brett in selecting the samples for analysis are acknowledged. Credit is due Homer N. Austin and Theodore R. Polhemus for the nitrogen determinations.

Variable Pitch Airplane Propeller

CURTISS AEROPLANE & MOTOR CO., INC., of Buffalo, are adopting on some models a controllable pitch propeller, a feature which enables the pilot to change the propeller pitch while in flight.

Details of design are shown in the accompanying illustration.

The three propeller blades are pivoted on radial bearings, and connected through bevel gears to a master bevel which is driven by a 1/6 hp. 12 volt reversible d.c. electric motor, located in front of the propeller and bolted to the blade hub.

The design is made practical by a concentric high ratio but very compact speed reducer—a 27,000 to 1, three stage Heliocentric speed reducer, made by the Universal Gear Corpn. of Indianapolis. The Heliocentric type reducer, together with other mechanism, makes positive control gradual propeller pitch change possible without complicated or bulky parts.

The pilot controls the pitch of the propeller electrically, the small driving motor being contacted through slip ring brushes just back of the blade hub assembly.

Torque springs between the output shaft of the reducer and the three movable blades cushion the back torque occasioned by the movement of the propeller in driving the plane.

The approximate overall dimensions of the 27,000 to 1, Heliocentric unit are only 4 in. in diameter and 4 in. long, the unit occupying a cylindrical space.

The code authority of the reinforcing materials fabricating industry and the Concrete Reinforcing Steel Institute, formerly at 333 North Michigan Boulevard, Chicago, have moved their offices to 201 North Wells Street, Chicago. R. W. Johnson, is secretary.

Brand and trade names in the furnace and refractory field, but largely of German companies, have been compiled in a 100-page pamphlet "Markenbezeichñungen," published for sale at 6 reichsmarks by L. Litinsky, Thiemstr. 6, Leipzig 0.27, Germany.

Guided by a leadscrew, springs are coiled on a mandrel; when coiled they are stripped from the mandrel automatically.

Buick Coil Springs Held Within Close Manufacturing Limits

HAVING a life from four to six times that of leaf springs of equivalent strength, coil springs which are part of the so-called "knee-action" independent springing of front wheels on the Buick cars are made in the plant of the Buick Motor Co. at Flint, Mich. In the manufacturing process they are held within limits of 0.002 in., an exacting tolerance in the production of springs.

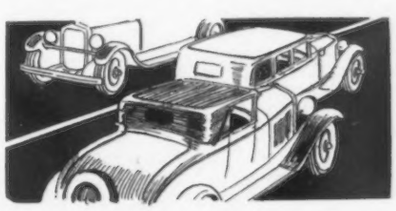
Coil springs are fabricated from S.A.E. No. 9260 silicon manganese steel, which is purchased centerless ground from the mills. The centerless grinding removes any surface flaws or decarburization which may have been introduced in rolling, and guarantees material of constant gage. After grinding, the diameter of the steel is 43/64 in. for the Buick 50 Series, 45/64 in. for the Buick 60 Series, and 23/32 in. for the Buick 90 Series.

When bought from the mill, the bar stock is 133 in. long for the 50 Series, 137 in. for the 60 Series and 136 in. for the 90 Series. The first operation is to form a flat bearing surface at each end of the spring. This is done by heating the bar at each end and running it between rolls to flatten it for a distance of about 1 ft.

The entire bar then is heated to a temperature of 1560 deg. F. preparatory to coiling. This comparatively low temperature, and also use of a neutral furnace atmosphere, prevents excessive formation of scale. Thus there is practically no change in the surface analysis of the steel, an important consideration inasmuch as maximum stress occurs on the surface.

Guided by a leadscrew, the spring then is coiled on a mandrel. After being coiled, it is automatically stripped from the mandrel. Some taper is necessary to facilitate the removal, but it is held to less than 1/32 in. in the length of the spring.

The spring is placed on a continuous conveyor which carries it into a heat-treating furnace for hardening, being held at 1610 deg. F. for 45 min. As it emerges from the furnace, it is put in a fixture, which holds it straight and to the correct free length, and dipped in an oil bath for 75 sec. This bath is maintained at a temperature of 100 deg. The oil feeds into the inside of the spring, quenching the inner portion of the coils first.

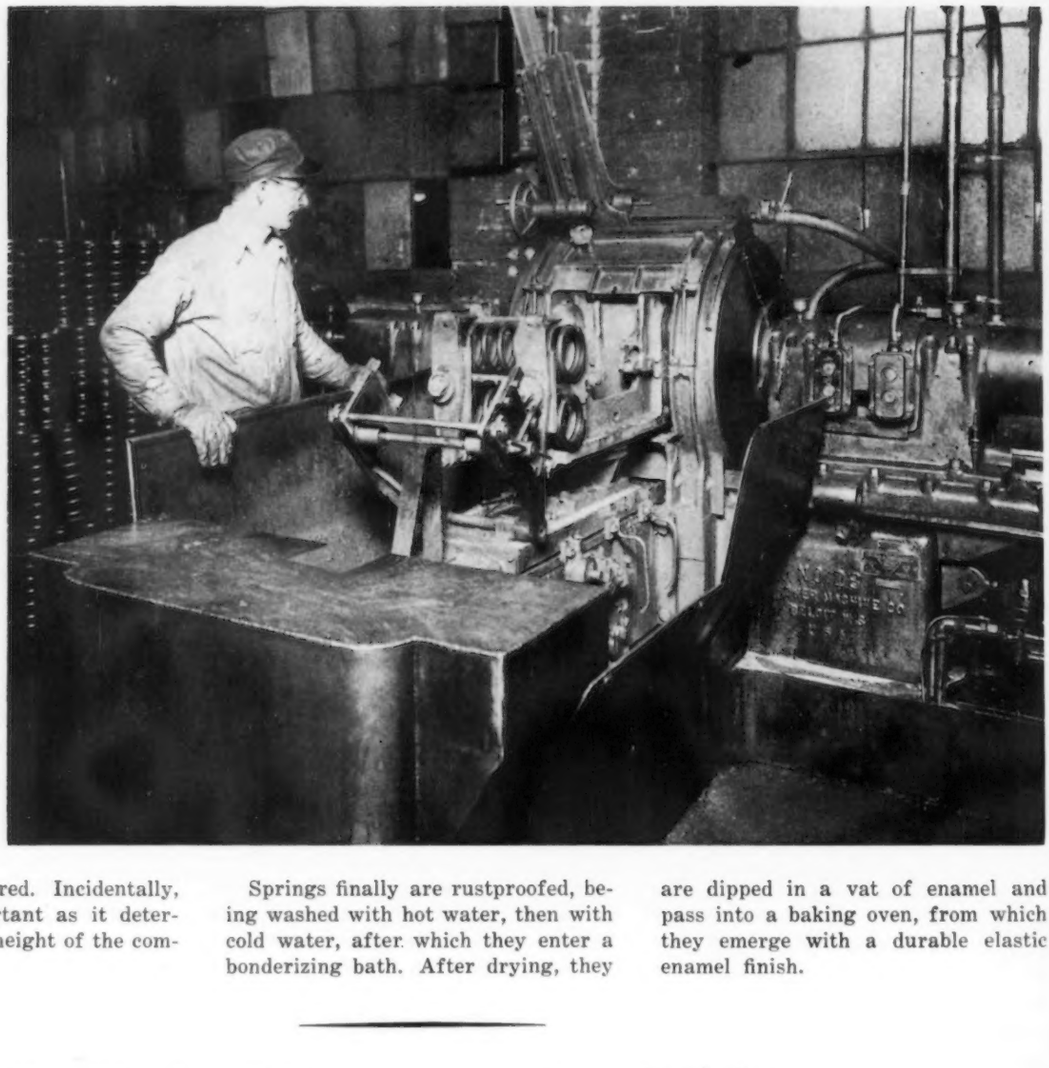


After removal from the oil bath, the spring enters a tempering oven, where it remains for 90 min. at 875 deg. At the end of this period it is quenched in cold water. This cools the spring for handling purposes and removes any scale which may have formed in previous operations. Each spring then is inspected for hardness and must fall within the close limits of a Brinell diameter of impression of 280 to 300.

Ends of Springs Are Ground

Following inspection, the springs are placed in an automatic fixture which holds them at right angles to the face of the grinding wheels of an automatic grinding machine. They are ground flat on each end simultaneously, thus providing a perfect bearing surface at right angles to the center-line of the spring.

After being ground, each spring is put in a machine which completely compresses it. It then is allowed to go free and the height measured. If it falls within the close limits specified, it is passed to a final check. Here it is compressed by a load equal to that which it will receive in the car, and



Two springs are ground flat on each end simultaneously in an automatic grinding machine, the fixture holding the springs at right angles to the face of the grinding wheels. This process provides a suitable bearing surface at right angles to the center-line of the spring.

the height is measured. Incidentally, the height is important as it determines the standing height of the completed car.

Springs finally are rustproofed, being washed with hot water, then with cold water, after which they enter a bonderizing bath. After drying, they are dipped in a vat of enamel and pass into a baking oven, from which they emerge with a durable elastic enamel finish.

Builds Small Precision Boring Machine

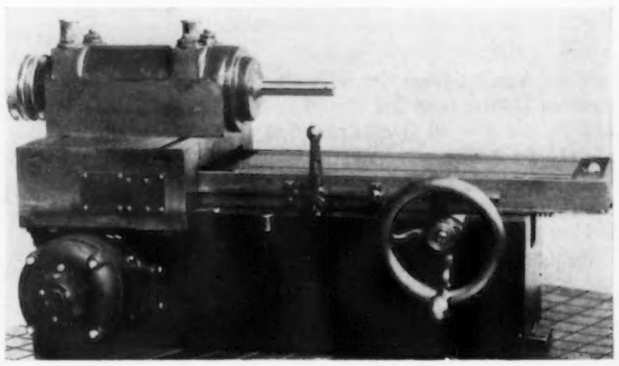
FOR economical production boring with diamond or carbide tools, the Stokerunit Corpn., Milwaukee, is offering the small precision machine here pictured, which is designated as the Simplex.

Specifications include: Feed length, 9 in.; rate of feed, 1 to 9 in. standard or 2 to 18 in. special; spindle speed, 600 to 6000 r.p.m.; centers between heads, 5 in. minimum and 9 in. maximum; and center-line of spindle top of table, 4 in. The overall length is 30 in.

The base is a heavy, ribbed, semi-steel casting with scraped ways that have oil reservoirs to provide constant lubrication. The bridge that carries the boring head is bolted to supports that are cast integral with the bed. A full-length table with oil return channels is fitted to the bed. The entire top surface of the table, including the edges, is accurately finished to provide maximum room for mounting fixtures.

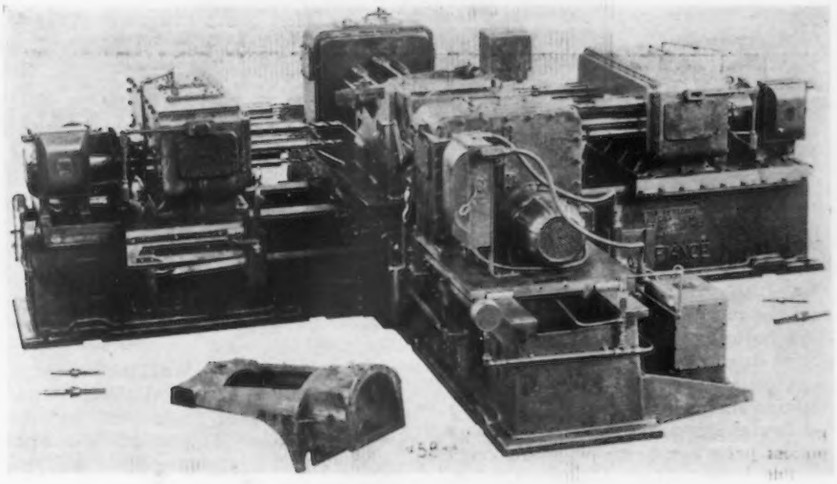
Spindle carriers are of unit type, adjustable as to location and two may be mounted for simultaneous operation if desired. Each spindle is provided with air circulating means for keeping the temperature low and thus preventing trouble due to expansion and misalinement.

The feeding mechanism is driven by an individual 1/15-hp. motor through pickoff gears. The feed motor and the ½-hp. spindle motor are electrically interconnected so as to start and stop simultaneously. An adjustable stop on the table trips a limit switch at the end of the table travel, and is reset automatically when the table is returned. Table return is by means of a hand-wheel. When the fixture has been loaded the operator returns it to the start of the cut, pushes a button to start the motors, and then engages the feed lever on the table. The machine then feeds until the limit switch operates. The net weight of the machine is 410 lb.



Precision and high finish are obtained. The spindle is mounted in a ball bearing at the pulley end and a long lead-bronze bushing at the front end. The latter is tapered on the outside to permit close adjustment.

Four-Way Drilling and Reaming Machine of Heavy Design



A NEW extra-heavy four-way horizontal drilling and reaming machine with multiple-spindle heads has been brought out by the Defiance Machine Works, Defiance, Ohio. The particular unit illustrated is equipped for drilling and reaming 53 holes in main front tractor frames. However, the machine may be built with any number of heads or spindles in the heads to suit requirements.

The base is of heavy core design with one center member that holds the fixture. To this center unit are attached four separate members which carry the slides upon which the opposed multiple-spindle heads and motors are mounted. Heads are fitted with heat-treated alloy spindles and gears, are entirely inclosed and are lubricated by means of a force feed system. A direct-connected motor drives each head.

Of box type, the fixture is mounted on the center member of the base and is removable. It is equipped with guide bushings and with quick-acting screw clamps for locating and holding the frames in position. The machine has two separate Oilgear pumps and cylinders for feed under each head. Each pump drives the two opposed heads and the machine is so arranged that either two or four heads are in operation at the same time.

Each opposed set of heads is equipped with steel cut rack and pinion for timing. Each Oilgear pump is driven by a 3-hp., 900-r.p.m. motor, permitting a production of 10 to 12 frames an hour in drilling and reaming all four sides. The heads are driven by 15 and 7½-hp., 1200-r.p.m. motors. The machine may be equipped with either plain bronze bearings or anti-friction bearings where centers will permit for all spindles in the heads.

Water-Cooled Internal Grinder Wheel-Head

A WATER-COOLED wheel-head, which, it is stated, can be operated continuously with no appreciable temperature rise has been placed on the market by the Wicaco Machine Corpn., Wayne Junction, Philadelphia. The oil chamber and bearings are surrounded by a generous cooling jacket through which ordinary grinding coolant is continuously pumped. This maintains the lubricant at the desired viscosity and eliminates chatter by holding bearing wear to a minimum.

The spindle is constructed to allow the ball bearings to absorb only enough heat for efficient operation, thereby eliminating the chatter that usually results from cold and too-free bearings. Maximum spindle speed ranges from 10,000 r.p.m. on the large head, 15,000 to 18,000 r.p.m. on the medium size head, and 25,000 r.p.m. on the small head. The spindle is designed to rest completely within the bed of the cross-slide, and does not overhang to cause torque or spring. The heads are furnished with either quill or solid type spindle, and with bases designed to fit all types and sizes of internal grinders.

Ordinary coolant is pumped continuously through the cooling jacket.

Variable-Speed Pulley

SIMPLICITY and compactness are features of a new variable-speed pulley recently added to the line of speed reducers and transmission equipment manufactured by Winfield H. Smith, Inc., Springfield, Erie County, N. Y. The pulley consists of two conical sections, or two half pulleys, that have slots on their conical faces, permitting them to interlock and giving a cog or positive drive effect. Each half pulley is mounted on a bushing having a spiral key which engages with a spiral groove in the bore of the pulley. The bushing is keyed or set-screwed to the motor shaft.

As the base of the motor is moved back and forth the two half pulleys will move together, or will separate, causing the belt to run on a small or large diameter of the pulley. The variation in speed is obtained by driving from either the smallest or largest diameter of the pulley, or from any diameter between. The center of the two half pulleys is always in line with the center of the driven pulley which permits the use of a standard V-belt and of a standard V-belt pulley for the driven pulley.

Speed variation is obtained by driving from any diameter between the smallest and largest.

Russo-American Trade Relations

By JAMES A. FARRELL
Chairman, National Foreign Trade Council

CONDITIONS in the United States and throughout the world have combined to bring into prominence the question of future trade relations between the United States and Soviet Russia. The effects upon European countries of the prolonged depression make it increasingly difficult for Soviet Russia to supply its pressing needs by purchases based on long-term credits. Hence Russia's offer, made at the London Economic Conference, to make heavy purchases in the near future, provided long-term credits are available.

Credit Precedent in Cotton Sales

Russia was enabled to supply her needs in cotton recently by means of credits created by the Reconstruction Finance Corpn., a precedent having been established by similar loans to China. Arising out of these transactions with Russia, and following an intensive propaganda in the United States which has restored diplomatic relations and led to more formal trade relations with Soviet Russia, negotiations have been carried on at Washington with regard to this question of our future trade with that country. The opportunity is presented, therefore, of reviewing this subject in its relation to our present national policy of seeking to promote increased foreign trade by the instrumentality of bilateral trade agreements.

The political implications involved in the present negotiations between our Government and that of Russia are outside the scope of our present task of determining how the United States may advantageously enter into closer and more formal trade relations with Russia, with due consideration for our trade relations with other countries.

The question has been raised by economists and various organizations of the amount of trade with Russia which might form the basis of a reciprocal trade arrangement. It is proposed that our exports to Russia should average annually $100,000,000, and that our purchases from the Soviet Union should average about $25,000,000. It was the stated intention of the Russian delegation to Washington to ask that the purchases by the United States in Russia shall be in excess of this sum of $25,000,000. In the meanwhile, reports from Washington indicate that our Government officials find great difficulty in discovering in our import needs any present hope of greatly increasing our imports from Russia. On the other hand, Russia's offer of purchases in the United States contemplates an immediate increase in our exports to that country, estimated at $400,000,000, in a report to former Assistant Secretary of State Harry F. Payer by Mr. Donaldson of the Case School of Applied Science.

It may be assumed that the pressing aims of the NRA, coupled with the pressing needs of the new economic order in the Soviet Union, are the compelling influences that dominate the negotiations entered upon at Washington. It is all the more necessary, therefore, that careful consideration should be given to the trade advantages promised by the opening of these negotiations with the delegates of Soviet Russia. It is essential that we weigh well all the facts in the case, presented by those who see in the present trade negotiations the rich promise of unlimited trade possibilities in the Russian market. Of chief importance is the effect upon our trade with other countries of any agreement with Russia whereby our imports from that country may be increased.

The tendency, in face of present world trade conditions, to effect arrangements for increasing trade by a process of special barter, is open to the objection of being often in conflict with the fundamental principle of our tariff policy—equality of treatment for all countries. While exceptions may arise that present no difficulties from this standpoint, as a general policy the principle of barter may have the tendency to render more difficult the carrying out of reciprocal trade negotiations, the ultimate aim of which is conformity with the principles that govern and promote world commerce.

Present trade conditions in the United States, which are an incentive to trade arrangements with Russia, should not hide from us the fact that the incentive to buying in the United States is equally strong on the Soviet side. The great developments in the industrialization of Russia have been accomplished largely by means of American industrial equipment and with the aid of American engineering and technical management.

Our Exports to Russia

Our export trade with Russia[1] has been governed chiefly by Russian preference for American industrial equipment and methods and by credit conditions. Our exports in this depression period have dropped from a high level of $103,000,000 in 1931 to $12,324,275 in 1932 and $8,660,907 in 1933. This decline was due to smaller shipments of machinery, motor trucks, automobile parts and accessories and agricultural tractors and implements. How much of this decline was due to increased domestic

Trade of the United States With Soviet Russia in Europe and Relative Position of Russia to Total Trade of the United States for Specified Years

(Compiled by the Tariff Commission from data furnished by the Bureau of Foreign and Domestic Commerce, February, 1934)

(Values in thousands of dollars)

Year	General Imports: Value	General Imports: Per Cent of Total Imports Into the U. S.	Exports (Including Reexports): Value	Exports (Including Reexports): Per Cent of Total Exports From the U. S.
Average—				
1910—1914	$19,131	1.13	$23,456	1.08
1921—1925	[1] 4,557	0.13	[1] 31,749	0.72
1926—1930	16,615	0.41	75,600	1.58
Year—				
1927	12,139	0.29	64,086	1.32
1928	13,949	0.34	72,504	1.41
1929	21,520	0.49	81,547	1.56
1930	21,963	0.72	111,362	2.90
1931	12,611	0.60	103,486	4.27
1932	9,127	0.69	12,466	0.77
1933	[2] 11,347	0.78	[2] 8,717	0.52

[1] Includes Ukraine for 1921-1924.
[2] Preliminary.

General Imports Into the United States From Soviet Russia in Europe Calendar Years 1933 and 1932

Month	1933	1932
January	$840,918	$1,195,897
February	805,441	537,583
March	684,322	558,032
April	917,824	933,981
May	699,893	641,952
June	936,139	891,854
July	788,206	723,819
August	1,261,841	871,406
September	1,353,038	697,545
October	1,101,430	742,792
November	886,402	713,824
December	1,071,550	618,773
Total for year	$11,347,004	$9,127,458

[1] A recent study by the Tariff Commission of trade between the United States and Russia shows that United States exports of machinery and vehicles to Russia—which make up the bulk of the exports from United States to Soviet Russia—dropped from 94 million dollars in 1930 and 98 million in 1931 to only 11 million in 1932.

production of some of these in Russia at the end of the first Five Year Plan is an interesting subject for inquiry. In Great Britain it is the opinion that the saturation point has been reached for the present in heavy machinery and industrial equipment. According to reports, the second Five Year Plan calls chiefly for imports of light machinery and essential raw materials.

In considering the possibilities of the Russian market for United States trade, it may be pointed out that Russian imports average about $400,000,000 annually. A reasonable proportion of that trade for the United States would be about $100,000,000. Owing to Russia's present difficulty in obtaining long-term credits in Europe, the offer is made to place the bulk of this trade in the hands of American manufacturers, provided long-term credit arrangements can be effected.

Over a 5-year period before the war, our average exports to Russia were less than $25,000,000 in value. For the 5-year period ending Dec. 31, 1932, our exports to Russia averaged about $76,273,000. It cannot be maintained, therefore, that our unofficial relations with Russia since the war have had a prejudicial effect upon the trade between the two countries.

Difficulty in Increasing Imports From Russia

Some of the increases in imports[2] from Russia in recent years have included commodities that enter very largely into our trade relations with some of our other leading world suppliers. Manganese, asbestos, pulpwood, lumber are products in relation to which the United States is not in a position advantageously to make exclusive or exceptional arrangements with Soviet Russia. It would be extremely difficult, if not impossible, satisfactorily to employ these imports as bargaining advantages which we could concede preferentially to Russia in exchange for some fixed level of exports. Certainly other foreign suppliers would feel themselves discriminated against.

Without Russian manganese, for example, we can still supply all our domestic requirements. Our normal consumption of manganese is about 500,000 tons annually of 48 to 50 per cent metallic content. From domestic sources we obtain about 50,000 tons annually. The remainder comes from mines in Brazil, Cuba and the West Coast of Africa which are owned by American steel companies. If we took from Russia a substantial quantity of imported manganese ore required in the industry, the mines in Brazil, Cuba and Africa would have to close down, with serious loss to the investors and with consequences that might affect our trade relations with these countries in which the mines are situated.

Any exceptional arrangement with Russia that diverts trade in particular commodities from other countries must in the end prove disadvantageous for the United States. Our objections to the Ottawa trade agreements were based largely on this artificial diversion of trade from the United States. Viewed from this standpoint, fundamentally there is no essential difference between trade agreements of this kind based on barter, and a trade agreement that introduces the quota system.

Canada for a time was our leading market, and at present is second to Great Britain only as our leading market. It is of greater importance to the United States that a satisfactory trade agreement be made with Canada than that we should seek to increase our exports to Russia by buying from Russia commodities the continued importation of which from Canada must constitute major considerations in our trade negotiations with that Dominion.

At a time when we should be having commercial negotiations with Canada, with the object of modifying the effects of the Ottawa trade agreements upon our trade relations with that country, nothing should be allowed to intervene which would prejudice our efforts towards closer trade intercourse with our northern neighbor.

Credit Our Chief Bargaining Advantage

Our bargaining advantages in trade negotiations with Soviet Russia do not necessarily call for an agreement on our part to make larger purchases in Russia. Other considerations occupy the stage. At a time when Russia prefers American machinery and needs the aid of American engineering efficiency, and when it is so difficult for the Soviet Government to obtain the necessary long-term credits elsewhere, we possess adequate bargaining advantages in the matter of extended credit, as now available through the Export-Import Bank.

It has been obvious that satisfactory credit terms, of the character required by Russia, cannot be provided in general by American exporters. Our trade with Russia in the past has been carried on for the most part on a basis of short-term credits, averaging around 13 months. One American firm only is credited with having made a 5-year credit arrangement.

Our opening transactions with the Soviet Union were initiated by that country in 1923, when cash was paid for cotton, copper and machinery that were urgently needed. Trade increased from that time onward until last year, which marked the close of the first Five Year Plan. This trade increased in spite of the absence of exceptional credit facilities and in spite of nonrecognition. It was a trade which responded to the law of supply and demand. It is only fair to say that in all our trade transactions with the United States, no complaint has been made of default on payments by the Soviet Union.

When we are asked, however, to extend longer credits to the Soviet Union, we are bound to inquire into the experiences of other countries whose trade with Russia has been developed on a basis of long-term credits. The temporary necessities of exporting countries continue to work in favor of the Soviet Union in the matter of purchases abroad. Whatever advantages may be derived temporarily from the present necessities of Russia for producer goods—as in the case of recent purchases made in England—the question to be considered in any trade agreement between the United States and the Soviet Union is the future stability and permanence of the Russian market both for producer and consumer goods.

Britain's Experiences

British Chambers of Commerce will be accepted as a reliable guide in matters affecting trade with Russia. These Chambers are opposed to any agreement with Russia which would frustrate in any way the terms of the Ottawa agreements. They have questioned the wisdom of extending to Russian trade the advantages of the British export credits guarantee system. They seek an equalization of trade[3] with Russia, on grounds that have an important bearing on the question of increased Russian imports into the United States. British Chambers also have gone on record in recommending to their Government that, in any trade agreement with Russia, provision should be made that half of the freights and other services in connection with Anglo-Russian trade should be British, and that the Government should stipulate for the recognition by the Soviet Union of old debts contracted by Russian subjects, and for payment of compensation on British property confiscated in Soviet Russia. With trade on a reciprocal basis, it is the opinion of the British Chambers that it is unnecessary to guarantee credits on British exports to Russia. They recommend that if security be required on shipments to Russia, this should take the form of a lien on exported goods, or some other concession.

British Chambers of Commerce emphasize two things of importance to the United States. The growth of trade between Great Britain and Russia developed on the Russian side such a large favorable balance of trade, payable in gold, as to creat a reaction against trade agreements with that country. For the first three years, 1921-23, Russia built up a favorable

[2]While imports from Soviet Russia have not reached their relative position in the total imports into the United States that they held in pre-war period, there has been almost a constant increase in that position for more than a decade.

[3]The new Anglo-Russian trade agreement (February, 1934) aims at gradual correction of present trade balance, which now heavily favors Russia, until Russia buys as much in Great Britain as she sells there. This agreement aims also at safeguarding more effectively of Ottawa trade agreements in Great Britain's future trade relations with Soviet Russia.

balance of trade amounting to $60,000,000. At the end of eight years' trade, the Russian favorable balance, payable in gold, had mounted to $500,000,000. The complaint made by the British Chambers of Commerce was not only with reference to the growth of Russian imports into the United Kingdom. It is alleged that Russia drew upon this huge gold reserve in Great Britain to pay for commodities in other countries which Great Britain was in a position to supply.

Instability of Russian Market

The second point emphasized by British Chambers is the instability of the Russian market, and the absence of a market in Russia for consumer goods. The rapid industrialization of the Soviet Union is making that country more independent of the outside world for consumer goods. In addition, the low standard of living accepted passively by the Russian people furthers the Soviet policy of restricting imports of consumer goods. Behind the new economic order in Russia is the philosophy of the Communist which aims at national self-containment. It is a question for consideration, therefore, whether the economic reconstruction of the Soviet Union on the basis of this Communistic philosophy gives future promise for the exaggerated hopes expressed by many Americans, of trade possibilities in Russia. With the completion of the second Five Year term it may be possible to form more definite conclusions regarding this, but at present the outlook brings no definite assurance of a future Russian market of expanding potentialities for the American exporter.

Temporary Trade Prospects

We seem to be confined, therefore, in discussion of the terms of a trade agreement with Russia, to the temporary trade advantages that offer during the period of the second Five Year Plan. This brings us to a consideration of the credit terms required by the Soviet Government, and of the policy to be pursued by our Government in financing large credits arising out of any agreement now made with Russia. As the Soviet Government is the sole customer in Russia—all trade, domestic and foreign, being a Government monopoly—difficulties of negotiation are simplified.

Export Credits Guarantee System

The large purchases made by Russia in the past in European countries were financed on a long-term credit basis by means of government guarantees of export credits. The Export-Import Bank, established by the government in Washington in recent weeks, will be the agency through which the United States government will proceed in the financing of Russian business. It is announced that the bank will have power to endorse or guarantee all or part of transactions with the Soviet Union. Exporters, the announcement says, "will be expected to participate in such credits as may be extended, when and to the extent that it seems proper they should do so."

It seems quite evident that there will be demands upon such a bank to expand its operations to countries other than Russia.

It is important, therefore, in contemplating the future operations of the bank to examine the financing mechanism, particularly guarantees, in Great Britain and Germany.

Until 1929, Great Britain did not extend to Russian trade the advantages of the export credits guarantee system, by means of which trade with other countries since the war had been promoted. In 1929, with increasing trade with Russia, 60 per cent of the invoice value of exports to Russia was guaranteed by the Government, the maximum guarantee on exports to other countries being 75 per cent of the value. In the case of heavy engineering shipped to Russia the guarantee was raised to 70 per cent, with a time limit of 12 months. The credit formerly extended on this class of exports ran for periods of from 18 to 30 months.

The annual premium on British guarantees of Russian credits is 8 to 9 per cent. In 1932, the cost to the British manufacturer of the financing of Russian orders was 12 to 15 per cent for the guaranteed portion, and 25 to 40 per cent for the unguaranteed portion of Soviet acceptances.

German Trade With Russia

The bulk of Russian trade is confined to three countries in the order named—Germany, Great Britain and the United States. Germany's large trade with Russia has been developed by means of government guarantee of export credits. This provides for the guarantee of 70 per cent of the invoice value, the risk being apportioned as follows: Federal Government, 40 per cent; the Provincial Government in whose area the exports originate, 30 per cent; the exporter, 30 per cent. Some German municipalities, notably Hamburg, provide credit guarantees on local exports.

While the quarterly fee of ¼ of one per cent charged the exporter is small, the cost of the rediscounting of Soviet paper is a heavy item. The rate on guaranteed bills is 12 per cent upwards. The regular German banks are slow to discount Soviet acceptances, even when guaranteed. As final Russian payments run up to 36 months, German banks are loaded up with Soviet paper and no longer provide easy facilities for rediscount. Banking consortiums are formed from time to time for the financing of Russian trade, but at present the amount available through these for rediscount of Soviet bills is reported to be limited to 50 million marks.

Financial conditions in Germany now throw upon individual firms the task of financing through their own organizations Russian orders for heavy engineering manufactures.

At one time the Bank for International Settlement refused to rediscount Soviet paper, but since then has taken from German banks bills amounting to 100 million marks. The smaller exporters in Germany are compelled to pay exorbitant rediscount rates through speculative firms. When the German export credits are not guaranteed, the rediscount rates run from 20 per cent upwards.

The credit on German exports varies from 13 to 29 months and over. The practice generally followed is to advance to the exporter, under the guarantee system, 20 per cent of the value when the order is placed, in the form of promissory notes payable in 13 to 29 months from date of delivery. The remainder is paid to the exporter on delivery of the goods, in the form of notes running from 13 to 29 months. It has been estimated that one-half of the German exports to Russia are on a 24 months' basis. Outstanding German credits on Russian trade are estimated at one billion, five hundred million marks, 70 per cent of which represents government risks.

Italy's Experience

Italy, like Great Britain, discovered after one year's trading with Russia, under an agreement, that she had bought from Russia on a cash basis goods valued at $29,000,000. In the same period, on long-term credit basis of 9 to 52 months, Russia bought from Italy goods valued at $14,000,000. As the Bank of Italy does not rediscount Soviet paper, most of the balance was carried over to the second year, at the end of which Russia had a favorable balance of trade of $20,000,000 payable in gold. Italy declined to renew the trade agreement and negotiations were opened up with regard to future trade arrangements.

Unless the philosophy underlying the Communistic economic order in Russia is altered fundamentally, the hopes held out for trading advantages in a stable and permanent Russian market do not seem possible of attainment. The fact that England is seeking dollar for dollar trade with Russia, and that Canada has had reason to complain of the adverse effects upon her trade of the dumping by Russia of grain, pulpwood, lumber, butter and other products, should cause the United States to weigh carefully the terms of any trade agreement with the Soviet Union. Russia is a market for producer goods. The foreign trade of the United States has been developed largely by the sale abroad of consumer goods.

Russian Imports Into U. S.

Russia has a wide range of noncompetitive goods for which an expansion of trade in our market is possible with returning prosperity and in-

creased buying power. The mistake should be avoided of any barter arrangements with Russia which would make it more difficult for this country to effect more advantageous trading terms with countries like Canada.

The purchasing power of the Soviet Union has been adversely affected by the fall in prices of basic commodities and by the present adverse trade balance, including freight and other services, estimated at about $125,000,000.

The important questions to be considered in connection with the proposed trade agreement with Russia are the time limit fixed and the volume and character of imports from Russia which the United States can advantageously absorb. The experiences of Great Britain and Italy seem to indicate that the financial needs of the Soviet Union and the trade monopoly possessed by that Government are factors contributory to an excess of imports from Russia, unless safeguards are provided by the agreement.

The belief in some quarters that our exports to Russia could be increased by increasing our imports from that country minimizes the importance to our export trade of our present imports from other countries. The major part of Russia's exports comprise grain, anthracite coal, oil, pulpwood, lumber and wood products, manganese, asbestos, furs. Investigation will reveal the difficulty of absorbing some of these in amounts which, while satisfying Russian requirements, would not affect adversely our trade relations with other countries. This is particularly true of our trade with Canada and with Latin American countries.

The problem of long-term credits on exports to Russia or to other countries is one which cannot be solved by individual exporters. It is asserted in well-informed circles that very little can be sold to Russia without credit for terms as long as 25 years. The solution of the question seems to lie with the new Export-Import Bank organized by our Government. The proposal that a buying and selling corporation should be established, with capital supplied by the Government, for the promotion of trade with Russia, is open to the objection that it lends an exaggerated imporance to our trade with Russia as compared with our huge trade with the rest of the world. The buying operations of this proposed corporation, confined to the Russian market, would inevitably tend to bring about the conditions complained of in England and Italy, by seriously dislocating our trade with other exporting countries.

The policy on which our Government has embarked, of straightening out our trade relations with other countries by means of bilateral reciprocal trade agreements, calls for an equitable adjustment of these to our world trade relations. Until definite assurance is forthcoming of stable and permanent trade conditions in foreign markets, any trade agreements entered into should be of a temporary character and safeguarded against the dumping of goods on our domestic markets.

Communism and Foreign Trade

In matters that enter into the diplomatic relations between the United States and other nations, the presumption that our State Department is well informed and capable of handling any situation that arises should be accepted in general by all Americans as the proper attitude to assume in the foreign affairs of their country.

While it is of no official concern to the United States what form the foreign government assumes, of paramount importance is the character of its government as affecting international trade relations. As trade in Soviet Russia is a government monopoly, the economic policies of that government are of prime consideration. We must, therefore, be careful to distinguish between a Communistic system, as this affects diplomatic relations, and a Communistic system which molds the character of Russia's foreign trade. The United States is competent to protect itself against the international tendencies of Russian Communism, as evidenced by the terms of recognition. In the matter of trade, however, this country is not competent to influence the economic trends under a Soviet Communistic system the basic principle of which is national self-containment.

The economic policy of Soviet Russia being one not of greater industrialization only, but one of national self-sufficiency, we must face the fact that this tendency lends little encouragement to the exaggerated hopes of many Americans, of a large permanent Russian market for American manufactured goods. That there is a temporary market for machinery and other producer goods should not lead the United States to build false hopes on a trade agreement which in some of its most important details may prejudice our trade arrangements with other countries that provide a permanent market for both producer and consumer goods.

Sound Basis of Russo-American Trade

While it should be our object as far as possible to encourage trade with Russia, this should be viewed in its proper perspective as a part of a whole. We are entering upon the serious work of reviving our foreign trade. This means the laying of sound foundations of international trade based on a natural exchange of commodities. Anything of a temporary or artificial character for the stimulation of trade with one country should not interfere with the general scheme of reciprocal trade relations with all countries.

Continental Establishes Pittsburgh Scrap Office

THE Continental Iron & Steel Co., New York, has opened a Pittsburgh branch located in the Oliver Building. The office is in charge of H. D. Stalnaker, who previously operated the Stalnaker Steel Co., prior to which he was the Pittsburgh district manager for Joseph Schonthal Co., Ohio Iron & Metal Co., and the Wilkoff Brothers Co.

The Continental company is one of the oldest concerns in the scrap iron business, having been founded in 1901 by Samuel Joseph. Since 1910 it has been under the direction of David Strauss and Milton Plaut. The firm is a large operator in rails for relaying and rerolling, and also deals in railroad and industrial scrap, both for domestic and foreign melters.

Bundy Tubing Co. Organizes Subsidiary

THE Bundy Tubing Co., Detroit, manufacturer of hydrogen-welded steel tubing, has organized a subsidiary company known as H. W. Bundy, Inc., to take over from the parent company the production of copper hydrogen electric welded commercial parts other than tubing. Production will include both custom hydrogen-welding of parts supplied by other manufacturers ready for welding, and production of finished articles. General offices will be maintained in the plant of the Bundy Tubing Co. at 10951 Hern Avenue and manufacturing will be done at the former Bundy Tubing plant at 4815 Bellevue Avenue. Officers of the new concern are W. W. Anderson, president; T. M. Rude, vice-president; A. C. Winger, secretary and treasurer; and H. J. Blair, superintendent.

Southern Industrial Council Organizes

THE Southern Industrial Council was made a permanent organization at a meeting held in Birmingham Feb. 26, and attended by manufacturers from 13 Southern States.

John E. Edgerton, president of the Lebanon Mills, Lebanon, Tenn., and a former president of the National Association of Manufacturers, was elected president. He had served temporarily since the preliminary meeting which was held in Chattanooga in December.

Other officers are William D. Anderson, Macon, Ga., and Donald Comer, Birmingham, textile manufacturers, vice-presidents; Robert C. Stobert, Hardie-Tynes Mfg. Co., Birmingham, treasurer; C. C. Gilbert, Nashville, secretary.

Open Prices Discourage Monopoly and Discrimination*

By HERMAN LIND
General Manager
National Machine Tool Builders' Association

THE Recovery Act was written with the clear intent of enabling industries to work together in an effort to bring back fair wages, fair working conditions, fair trade practices and prices under which industry might live. Published open prices are a means to that end. With the provision that there be no deviation from those prices, it means that all customers will be treated fairly, without discrimination. It enables the buyer to know that no one else is buying from an individual producer at a better price. Consequently, his effort is put to determining the real value of the product in proportion to the price offered him, instead of into a chiseling operation between hungry competitors.

Much emphasis has been placed on consumers' goods. Let us consider now durable goods such as machinery or equipment where individual manufacturers determine and establish their own prices by listing them with their Code Authority, their trade and their competitors. Through this method, if a manufacturer sets his price too high, he loses business; if he sets it too low, he loses money. If he has an honest motive in increasing or decreasing his price, sufficient length of time should be given his trade and his competitors to know that a change in price will be made, and that it is a matter of policy and not a matter of temporary expediency for an immediate advantage. Without a sufficient period of notice included as a part of open price policies for this type of equipment, it would, in my opinion, wreck the sound, firm price policy and put the recalcitrants in exactly the position they were before, bringing back cut-throat competition and giving individual buyers in some cases a discriminatory price. On the other hand should a seller feel he has an inside track, it would permit him immediately to raise his price for a specific order and again drop back, discriminating to the disadvantage of a given customer.

It has been claimed that the open publishing of prices is resulting in unfair and illegal fixing of prices in some industries. If this is true, there are in existence protective laws which provide plenty of power to investigate and prosecute the wrongdoers. The withdrawal of open price provisions, or the elimination of the period of notice of change of prices, will not stop price fixing where it now exists. The advantage that the National Recovery Act brought to industry was the advantage of making practical in operation the firm price policy on the part of individual industries through the ability of an industry to enforce in a practical way firm prices without chiseling and in eliminating unfair methods of doing business. To eliminate the provisions for administering in a practical way the firm price policy would take from industry the hope for fair and honest business methods that was promised under the Act.

Firm Prices in the Consumer Goods Field

In the industries of the consumer goods type or nearer the raw material stage, particularly those that are subject to wide and rapid fluctuations, it may be practical to operate on a firm price policy with very little notice of price changes. Ordinarily, a price on these products is a matter of a single or very few quotations instead of an entire series of lists to cover entire lines, types and series. By custom those industries are educated for quick price changes, but even in those, should it not be incumbent on the seller to make known a new price, whether higher or lower, and be required to accept all orders placed at that price.

Industry has suffered from the so-called back-log orders. They are frequently a subterfuge and unfair to the other purchasers of like products and usually discriminate against the smaller enterprise. The firm price policy is the only honest, sound and fair price policy, and on account of the minority of recalcitrants, a firm price policy can only be maintained in an industry through the open price policy, and the open price policy can only be effective in maintaining the firm price policy by providing such time of notice of change in price as to eliminate instant change of price as a subterfuge for cutting prices.

The National Industrial Recovery Act specifically provides against fostering of monopolies and all codes include it as a part of their provisions. It should be recognized that promotion of monopolies is not only a possibility of action between competitors but monopoly in the past has been fostered to a greater degree by discriminatory selling and discriminatory prices to favor customers.

The Retailer Should Play the Game

If the one price policy has proved itself of advantage to both the consumer and the retailer, and I believe that is generally admitted to be true, ought not the retailer be sport enough to buy on the same basis. In the equipment industries the immediate advantage accruing to the firm price policy and standard goods and to the one and last price policy on special goods would save a tremendous amount of money to both buyer and seller.

How many times do we find salesmen called back on the same negotiation, each time for the purpose of getting him to cut his price, and sadly enough many salesmen under this condition put in greater effort in selling the buyer the idea of giving him a chance to get another crack at the business than he does in selling the quality of his product and the service of his house?

Compare that with the situation under a price policy where the buyer knows that any price he gets is the only price he can get and allow him to put his entire attention in evaluating the relative merits against the known price, and should he know of a specific product he wants to buy he is perfectly safe in placing the order by wire or mail, and knowing that he will be buying at the price that any competitor will be buying, no more and no less. This is because under the proper listing and establishment of prices the records should be completely opened to any buyer as well as to competitors. This argument is not based on price fixing. It is based exclusively on the manufacturer, each manufacturer establishing his own price and that an honest price on which he is willing to stand or fall without subterfuge, misrepresentation or discrimination.

The injustices that have grown up between competitors and between customers have produced an inequitable situation for labor and is a problem for all industry to solve. The National Recovery Act was designed to put industry in position to solve it by establishing rules and regulations with the Government as arbiter of the rules and referee of the operation. Is it not fair and is it not wise then to allow the effort to go on with the Government encouraging those things that are right, correcting, and if necessary, punishing those that are wrong and in this way return not only to ethical business but to honest business?

**Part of a statement made to the Administrator by Mr. Lind at the public hearing in Washington, Feb. 27.*

Small Shops Will Suffer Most From Shorter Week

By GEORGE D. HARTLEY
Gen. Manager, Sleeper & Hartley

THE great majority of manufacturing plants in the United States employ less than 50 employees. These factories or plants are in the main, what might be called "single shift" factories.

For many reasons, unnecessary to enumerate here, it is not found to be practical, or economical to operate the majority of these plants with more than one daily shift of employees. They are, in most cases, "single shift" plants, and any reduction in the number of hours worked per employee per day or week or month in such plants means that a greater burden of fixed charges has to be carried or earned per hour by each such employee.

Only one single shift can usually be employed, and the whole burden of fixed charges is borne by this single shift. These fixed charges *are* fixed charges, and, with the exception of the power charge, they remain the same whether employees work ten hours, six hours or three hours per day. The only difference is that each employee must earn as much in six hours' employment, or three hours' employment, as he formerly did in ten hours, in order to cover the fixed charges against his hourage.

This overhead charge against direct labor may easily increase the total charge of labor, and the products of labor, to a point which makes labor practically unemployable. The product will not be wanted. It is not only too expensive—it is out of reason.

Foreign Competition Invited

Needless to say, such a condition opens the doors for most extensive importations from foreign countries.

For instance—consider an employee at 60c. per hr. who, upon a 55-hr. week basis, had an overhead charge on direct labor of 175 per cent or $1.05 per hr., to earn, in addition to his own labor charge of 60c. per hr. This employee, reduced to a 30-hr. week, has an overhead charge of 320 per cent against each hour, or $1.92 overhead, to earn for each of the 30 hrs. in addition to his own labor charge of 60c. per hr.

These charges are inescapable, and

TABLE 1

TABLE SHOWING AUTOMATIC INCREASE IN OVERHEAD (AND COSTS) DUE TO REDUCTIONS IN WORKING HOURS PER WEEK, IN THE SMALL SINGLE-SHIFT PLANTS AND FACTORIES

An Average Overhead of 175 Per Cent (on Direct Labor), is Assumed, and an Hourly Rate of 60 Cents Has Been Taken for Base

A Reduction in the Working Week		Increases the Percentage of Overhead to be Charged Against Direct Labor From		Increases the Overhead Charge in Dollars Against Each Productive Employee's Working Hour From $1.05	
From	To	175 Per Cent to—	Overhead	$1.17 per	Hour
55 Hours	50 Hours	192.0%	Overhead	$1.17 per	Hour
55 "	48 "	200.0%	"	1.20 "	"
55 "	44 "	218.0%	"	1.30 "	"
55 "	40 "	240.0%	"	1.44 "	"
55 "	36 "	267.0%	"	1.60 "	"
55 "	35 "	275.0%	"	1.65 "	"
55 "	30 "	320.0%	"	1.92 "	"
50 "	48 "	182.0%	"	1.09 "	"
50 "	44 "	198.8%	"	1.19 "	"
50 "	40 "	218.0%	"	1.30 "	"
50 "	36 "	243.0%	"	1.46 "	"
50 "	35 "	250.0%	"	1.50 "	"
50 "	30 "	291.0%	"	1.75 "	"
48 "	44 "	191.0%	"	1.14 "	"
48 "	40 "	210.0%	"	1.26 "	"
48 "	36 "	233.0%	"	1.40 "	"
48 "	35 "	240.0%	"	1.44 "	"
48 "	30 "	280.0%	"	1.68 "	"
40 "	36 "	190.0%	"	1.14 "	"
40 "	35 "	200.0%	"	1.20 "	"
40 "	30 "	233.0%	"	1.40 "	"

TABLE 2

SOME MACHINE COST COMPARISONS UNDER NRA IN A SINGLE SHIFT FACTORY

Fifty-Five Hour Week (Single Shift)						Thirty-Five Hour Week (Single Shift)					
Machine	Labor Hours	Labor @ 60c.	Material	Overhead @ 175 Per Cent	Total Machine Costs Without Profit	Machine	Labor Hours	Labor @ 69c.	*Material	**Overhead @ 275 Per Cent	Total Machine Costs Without Profit
A	161	$96.60	$20.16	$169.05	$285.81	A	161	$111.09	$20.16	$265.65	$396.90
B	179	107.40	41.70	187.95	337.05	B	179	123.51	41.70	295.35	460.56
C	407	244.20	136.91	427.35	808.46	C	407	280.83	136.91	671.55	1,089.29
D	721	432.60	370.00	757.05	1,559.65	D	721	497.49	370.00	1,189.65	2,057.14
E	1,195	717.00	590.00	1,254.75	2,561.75	E	1,195	824.55	590.00	1,971.75	3,386.00

TABLE FOR 35 HOUR WEEK

Machine	Increase Per Cent	Increase
A	39	$111.09
B	36	123.51
C	35	280.83
D	31	497.49
E	32	824.55

TABLE FOR 30 HOUR WEEK

Machine	Increase Per Cent	Increase
A	70	$200.92
B	66	223.39
C	62	507.93
D	57	899.76
E	58	1,491.36

Fractional hours and fractional per cents disregarded.
*Increases in material not yet fully ascertainable; old figures taken.
**Taken on original 60c. rate to forestall possible criticism.

must be paid in order to do business. See Table 1 herewith in which is given the automatic increase in overhead costs due entirely to reduction in working hours per week.

It may be of further interest to consider machine cost comparisons of a series of similar machines under two or three different weekly hourages.

In Table 2 herewith are different costs taken for a 55-hr. week, 35-hr. week and 30-hr. week.

And, if the employee's wage rates are increased to a point where they are paid as much for 30 hr. as for 40 hr., Table 3 shows the costs as they will confront the owners and managers of the great majority of the small manufacturing plants of this country.

Small Plant Penalized

Under normal conditions, it took a great deal of activity and hard work to sell the products of these innumerable little plants, both at home and abroad. It is going to be enormously difficult to sell the same products at these new prices. Some of these plants will get local jobbing and contract work, but most of them will simply close up, or drag along with two or three employees, on repair parts and work of this character, but meantime foreign products can be imported against almost any kind of duties and make a very handsome profit.

TABLE 3

MACHINE COSTS FROM TABLE 2 UNDER A 30 HOUR WEEK SINGLE SHIFT

Machine	Labor Hours	Labor 80c. Rate	Material Increase at Least 20 Per Cent	Overhead 320 Per Cent	Total Machine Cost Without Profit	Per Cent Increase	Increase
A	161	$128.80	$24.19	$412.16	$565.15	98	$279.34
B	179	143.20	50.04	458.24	651.48	93	314.43
C	407	325.60	164.29	1,041.92	1,531.81	89	723.35
D	721	576.80	444.00	1,845.76	2,866.56	83	1,306.91
E	1,195	956.00	708.00	3,059.20	4,723.20	80	2,161.45

It may also, in this connection, interest you to see an estimate of the losses in purchasing power in such single shift industries under such working conditions and these are shown, in Table 4 herewith.

It has been said, and it will be said (and indeed it is a favorite remark of the theorists) that in such industries, "The employees will be found to do as much work in a 30-hr. week as in a 40, 50 or 60-hr. week." The person of experience will merely ask, "How may this be accomplished." Tools, equipment and machines will not be run any faster; there will be just as many interruptions, and as much lost time generally, in proportion, and the majority of production managers and superintendents have found in their experience that such statements are simply not true.

The objections to a reduction in weekly hourage may be summarized as follows:

> The majority of our manufacturing plants must be run on single shift basis. They cannot derive any benefit from operating on double or triple shift whether they had the business or had not the business, nor can they employ more help on the reduced week. What really happens is that the output of each little factory is reduced; the cost of production within it increased enormously; the employees' purchasing power is reduced very materially; and the competitor in foreign countries gets quite a "break."

TABLE 4

LOSS IN EMPLOYEES' PURCHASING POWER UNDER VARIOUS REDUCED WORKING WEEKS

Let us take the case of a small plant with 25 productive employees, having an average hourly rate of .5322 cents and each earning, in a week of 55 hours, an average of $29.27 per week.

In a 40 hour week each man will earn an average of $21.29, and in a 35 hour week each man will earn an average of $18.63, and in a 30 hour week each man will earn an average of $15.97.

Showing direct losses in purchasing power respectively for each man of (a)$7.98, (b)$10.64, (c)$13.30.

If, under NRA or PRA an addition is made to the hourly rates of 15 per cent, each man will then earn, in a 40 hour week, an average of $24.47, in a 35 hour week, an average of $21.42, and in a 30 hour week an average of $18.35.

Showing direct loss in purchasing power respectively for each man of (d)$4.80 and (e)$7.85 and (f)$10.92, as compared with earnings on a fifty-five hour week basis.

The total weekly and yearly losses in purchasing power, for 25 men in one plant under the different hourages are shown below:

	Weekly		Yearly
(a)	$199.50	(a)	$10,374.00
(b)	260.00	(b)	13,520.00
(c)	332.50	(c)	17,290.00
(d)	120.00	(d)	6,240.00
(e)	196.25	(e)	10,205.00
(f)	273.00	(f)	14,196.00

Cost System Proposed For Malleable Industry

WASHINGTON, March 6.—A proposed cost accounting system and a schedule of fair and reasonable costs for the malleable iron industry were submitted by the code authority of that industry to Assistant Deputy Administrator O. W. Mason at a hearing last Saturday. The proposed system and schedule were presented by R. R. Fauntleroy of the Moline Malleable Iron Co., St. Charles, Ill., as a representative of the code authority.

The proposal accords with Article V of the industry's code and prescribes a number of primary divisions on which a specified minimum number of cost accounts shall be kept and outlines in detail a procedure for determining the cost of individual types of castings.

In establishing the proposed schedule of costs, it is provided that "A member of the industry may quote and sell any casting at a price less than that set forth in the approved cost schedule if such price is based on the actual cost experience of such member, determined in accordance with the approved cost accounting system . . . and providing further that such cost is filed with the secretary of the code authority not less than five days prior to the date upon which such cost becomes effective. . ." However, any member of the industry who identifies the particular casting in question and requests the lowest cost filed, must be informed by the secretary. It is provided that such cost may be used "by such other member as the fair and reasonable cost for such particular casting."

Objection to the establishment of the five-day period was made by C. C. Gibbs, National Malleable Iron Casting Co., Cleveland. He said that the provision would work a hardship on the buyer and might be construed by him as a price fixing attempt and lead to antagonism. Mr. Gibbs also said that violations of this part of the code would be difficult to enforce.

It was suggested by Assistant Deputy Mason that a revision be made so that all members in the industry would be notified of the lowest cost on file rather than requiring a member to request it. Sponsors claimed this would be impracticable because only a few members of the industry would be interested in a given casting. Supporting this view, Mr. Fauntleroy said the malleable iron industry is a "custom made industry." R. N. Cole, Canton Malleable Casting Co., Canton, O., expressed the opinion that members who are located at greater distances from the secretary would be at a distinct disadvantage if the five-day waiting period were eliminated.

THE NEWS OF THE WEEK

Revised Regulations Governing Posting of Labor Code Provisions

REVISED regulations requiring all employers operating under approved codes of fair competition to conspicuously post the labor provisions of those codes, in their establishments, were announced today by National Recovery Administrator Hugh S. Johnson.

The new regulations, superseding those issued on February 12, require employers to apply within 45 days for official copies of the labor provisions of all codes under which they operate.

The regulations were issued in accordance with an executive order dated Feb. 8, which directed attention to the fact that Section 10 (a) of the National Industrial Recovery Act prescribes a fine not to exceed $500, or imprisonment not to exceed six months, or both, for the violation of any rule or regulation prescribed under the authority of and pursuant to the provisions of this order."

In a general letter to code authorities, National Compliance Director William H. Davis inclosed copies of the regulations and urged that the recipients "come prepared to discuss the problems involved" at the conference of code authorities in Washington, beginning on March 5.

In view of the tremendous volume of printing involved, Director Davis called particular attention to the fact that "those code authorities which make their requests first will be given prior attention."

The texts of Director Davis' letter and of the revised regulations follow:

Letter from Director Davis to all Code Authorities

"By regulations dated February 28, the Administrator for Industrial Recovery has superseded the rules and regulations of February 12 regarding the posting of labor provisions of codes of fair competition. A copy of the new regulations is inclosed herewith.

"The regulations of February 28, which we inclose, provide that within forty-five (45) days from their issuance, or from the effective date of any code, or from the date on which the employer becomes subject thereto, whichever is latest, every employer must make application with the Code Authority established under each code to which he is subject for official copies of the labor provisions of the code. Application forms will be furnished to you by NRA.

"Upon application, you will furnish the employer with these official copies, to be prepared and furnished you by NRA, which are conspicuously posted at all times in every shop, establishment or separate unit 'in sufficient number to make them freely and conveniently accessible to all employees employed in such operations.'

"The problems connected with the distribution of these official copies will be discussed at the Code Authority Conference to be held with NRA next week. However, wherever possible, we do want to start prior to the meetings.

"Undoubtedly there are some Code Authorities which have a complete or nearly complete list of employers subject to their code. We urge that these Code Authorities immediately write to us for the necessary number of application blanks to be sent to their members. They should also send us at the earliest possible moment an estimate of the number of posters needed for their industry.

"It is important to note that this estimate of the number of copies needed should be broken down by states as a special printing of the poster will be required for each state. Some idea of how the posters are to be used is needed in order to estimate the number of posters to be printed. We suggest that you estimate the number required on the assumption that each employer will need at least one poster at each entrance and exit to his establishments. If this method is not practical for your industry, use some other basis of computation, but let us know in your request for posters upon what basis the estimate was made.

"Any Code Authority which does not now have a list of employers subject to its code should attempt, nevertheless, to send application forms to as many members of its industry as possible and call to the attention of all other members the requirement that they must apply for posters. Application forms will be available at NRA headquarters and at all post offices (except fourth class) throughout the country. Code Authorities should use all possible methods to inform employers of the Administrator's regulations.

"The application forms and the posters may be mailed and returned without postage.

"Matters relative to posting of labor provisions will be discussed at the meeting of Code Authorities in Washington, and come on the agenda of Group IV. We hope that you will come prepared to discuss the problems involved. We urge, however, that you do not wait for these meetings before following out the suggestions in this letter. It is a big undertaking to get the necessary applications and posters printed, and those Code Authorities which make their requests first will be given prior attention.

"All communications with regard to the posting regulations should be addressed to the Compliance Division, National Recovery Administration, Washington, D. C.

"WILLIAM H. DAVIS."

Regulations Governing the Posting of Provisions

"By virtue of the authority vested in me as Administrator for Industrial Recovery, I hereby prescribe the following rules and regulations which I deem necessary and advisable to carry out the purposes and intent of the Executive Order of the President dated February 8, 1934, with reference to the posting and display of the terms and provisions of Codes of Fair Competition:

"1. Every person shall, in the manner hereinafter provided, make application for and official copies of the provisions relating to hours of labor, rates of pay and other conditions of employment of each Code to which he is subject or may hereinafter be subject (such official copies of such provisions being hereinafter referred to as official copies). A separate application shall be made with respect to each Code.

"2. Each application for official copies with respect to any Code shall:

"(a) be made to the Code Authority established under that Code; and

"(b) set forth the full name of the applicant's enterprise, the nature of the applicant's business and the number and location of the shops, establishments or separate units in which the applicant is engaged in operations subject to the Code; and

"(c) be made within forty-five (45) days from the date of these regu-

lations or the effective date of the Code or the date upon which the applicant becomes subject to the Code, whichever is latest.

"3. A person who has made application for official copies relating to a Code and thereafter engages in operations subject to the Code in any additional shop, establishment or separate unit, shall within ten (10) days of so doing, make a supplemental application to the Code Authority setting forth the full name of the applicant's enterprise, and the number and location of the additional units.

"4. On application to the Code Authority, or as soon thereafter as possible, the Code Authority will furnish each applicant with official copies relating to the Code in question.

"5. In each shop, establishment or separate unit in which the applicant is engaged in operations subject to the Code he shall at all times keep the official copies posted conspicuously and in sufficient number to make them freely and conveniently accessible to all employees employed in such operations.

"6. Wherever, as to any person subject to a Code, the provisions of the Code set forth in the official copies are affected by a modification, exemption, exception, or stay, official copies of the modification, exemption, exception, or stay, or of the provisions as thereby affected, will be furnished by the Code Authority on its own initiative or at the request of such person, and thereafter shall be kept posted in place of or in conjunction with (as the Code Authority may specify) the official copies theretofore posted.

"7. No person shall display or post any incorrect copies of the provisions of any Code or any modification, exemption, exception, or stay relating thereto.

"8. The Administrator may remove all Blue Eagles from any person who fails to comply with these regulations.

"9. As used herein, the term 'Code' means a Code of Fair Competition approved under the National Industrial Recovery Act (other than the Code of Fair Competition for the Petroleum Industry).

"10. Nothing in these rules and regulations shall relieve anyone from complying with any provisions of any Codes relating to posting, displaying or furnishing copies of Codes or of provisions of Codes.

"11. These regulations supersede the rules and regulations prescribed by me under date of February 12, 1934, governing the posting of labor provisions of Codes of Fair Competition.

"HUGH S. JOHNSON,
"Administrator for Industrial Recovery.
"Washington, D. C.,
"February 28, 1934."

Annual Meeting of Reinforcing Institute

CONCRETE REINFORCING STEEL INSTITUTE, as the code authority for the reinforcing materials fabricating industry, will hold its tenth annual meeting at the Edgewater Beach Hotel, Chicago, beginning Wednesday, March 14 and concluding Thursday, March 15. This will be strictly a business meeting for the discussion of the problems before the industry in connection with the code of fair competition and its administration.

British and Continenal Steel Quiet, Producers Confident

LONDON, ENGLAND, March 6 (*By Cable*).—British pig iron is active, and Cleveland producers are easily disposing of their production at current prices. Pig iron stocks are low and a further increase in the production rate is in prospect.

East Coast makers of hematite have agreed to quote delivery in certain zones instead of "free on truck." Mixed numbers are now quoted at 68s., delivered in the Cleveland zone.

The export situation is unchanged. Semi-finished steel is being promptly consumed, although new business is quieter and consumers appear confident of future business.

Finished steel is benefiting from the recent substantial shipbuilding orders which include 4 steamers of 3200 tons for China.

South Africa has ordered nearly 8000 tons of rails and track fittings. Sheets are depressed and tine plate is quiet but steady, with new business and exports dull.

From the Continent come reports of negotiations between European tin plate producers with American interests regarding sales control. Thus far these have been without result but with favorable prospects indicated.

Continental iron and steel are quieter but the outlook is satisfactory. Important Russian plate orders are pending. Argentine rail orders are now being negotiated. The formation of a sales office for broad flanged beams is imminent.

Belgian steel producers have increased their monthly quota to 240,000 tons due to better demand but even this increase is regarded as inadequate in view of important state rail orders. Metallurgique de Hainaut, makers of sheets, will shortly relight two furnaces and Forges des Clabecq will relight one.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9				
Billets, open-hrth.	£5	10s.	to	£5	12s. 6d.
Tin plate, per base box		16s. 3d.	to		16s. 9d.
Steel bars, open-hearth	£7	17½s.	to	£8	7½s.
Beams, open-hrth.	£7	7½s.	to	£7	17½s.
Channels, open-hearth	£7	12½s.	to	£8	2½s.
Angles, open-hearth	£7	7½s.	to	£7	17½s.
Black sheets, No. 24 gage	£9	5s.			
Galvanized sheets, No. 24 gage	£11	5s.	to	£11	15s.

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

*Ingots	£2	5s.	
*Billets, Thomas	£2	7s.	
Wire rods, No. 5 B.W.G.	£4	10s.	
*Steel bars, merchant	£3	2s.	6d.
*Sheet bars	£2	8s.	
Plates, ¼ in. and up	£4	1s.	6d.
*Plates, 3/16 in. and 5 mm.	£4	3s.	6d.
*Sheets, ⅛ in.	£4	8s.	6d.
*Ship plates	£4	10s.	
*Beams, Thomas	£2	19s.	
*Angles (basic)	£3	2s.	6d.
Hoops and strip steel over 6-in. base	£3	17s.	6d.
Wire, plain, No. 8	£5	7s.	6d.
Wire nails	£5	15s.	
Wire, barbed, 4-pt. No. 10 B.W.G.	£8	15s.	

*Prices as established by European Raw Steel Cartel.

Steel Treaters to Discuss Cast Iron Hardening

THE relative merits of casting against chills, cyaniding, nitriding, heat-treating and alloying, will be the subject of the March 8 session of the American Society of Metals (formerly the Ameriean Society for Steel Treating) when they convene that evening at the Hotel Buffalo, Buffalo, N. Y.

J. S. Vanick of the development and research department of The International Nickel Co., Inc., will outline recent developments in these processes and will give commercial illustrations of practical applications of each method.

Dinner will be served at 6:30 o'clock, and the session is scheduled to open at 8 p. m.

Harnischfeger Sues For Flood Damages

HARNISCHFEGER CORPN., Milwaukee, has filed suit in the Milwaukee Circuit Court to recover damages of $21,458 resulting from a flooded condition of its plant and offices in February, 1933, when a nearby city water main burst. Defendants are James B. Clow & Sons, Chicago, manufacturer of the water pipe, and its surety, the United States Guaranty Co.; the City of Milwaukee; Wenzel & Henoch, Milwaukee contractors who laid the main, and its surety, the Massachusetts Bonding & Insurance Co.

Bethlehem Steel Billings Up $23,000,000 in 1933

AN increase in billings of more than $23,000,00 for the year 1933, as compared with the year 1932, is reported by Bethlehem Steel Corpn. in its annual report published March 15. The figure for the net billed value of products shipped and of other classes of business by subsidiary companies of the Corpn. was $120,163,374 during the year, as compared with $96,892,488 for the preceding year.

The value of business booked during the year was nearly doubled, being $157,279,186 in 1933 compared with $85,946,548 in 1932. The unfilled orders at the end of the year were more than double the preceding period, or $67,684,749, compared with $30,568,937.

The total income of the corporation and its subsidiaries for the year before charges for interest and depreciation, was $11,472,584 as compared with $594,138 for the preceding year. After deducting interest and other charges of $6,702,051 and depletion and depreciation charges of $13,506,256 there was a deficit of $8,735,723 for 1933 as compared with a deficit of $19,404,431 for the preceding year.

Cash in hand and on deposit and marketable securities held by the corporation at the end of 1933, valued at market, was $46,888,841, compared with $46,975,589 at the end of the previous year.

Operations of the steel plants of the corporation averaged 28 per cent of capacity, compared with 16.9 per cent for the preceding year.

The average earnings per hour of the employees of the corporation in the United States during the last quarter of 1933, exclusive of general, administrative and selling forces, was 61.1c., as compared with an average of 51.1c. for the first six months of 1933, an increase of 19.6 per cent.

The total number of employees in the Bethlehem companies has been increased substantially during the recent months. The monthly average number of wage earners in Bethlehem companies during the fourth quarter of 1933 was 56,277, as compared with 43,827 for the fourth quarter of 1932.

During the year Bethlehem paid $814,567 in pensions to retired employees, compared with $782,158 in the previous year. At the end of the year there were 1849 retired employees on the pension list.

The number of stockholders at the end of the year was 88,377. Of these 34,763 were preferred stockholders, 57,224 were common stockholders, and 3610 were holders of both preferred and common stock.

The report is signed by Charles M. Schwab, chairman of the board of directors, and Eugene G. Grace, president.

Girdler Reviews Republic Steel Performance in 1933

A REVIEW of developments in the steel industry during 1933 by T. M. Girdler, chairman of the board of the Republic Steel Corpn., is contained in the annual report of that corporation, which supplements the preliminary report made recently.

Net losses for the year after all charges were $4,049,253 as compared with $11,261,194 during the previous year. The net loss is after deduction of $6,225,918 for repairs and maintenance and provision for depreciation and depletion amounting to $7,610,502. Net working capital was increased during the year by $1,627,757. At the same time the funded debt was reduced $1,906,400 and the preferred stock of the Trumbull Cliffs Furnace Co. was reduced $176,200. Net sales during the year were $79,807,199.

"Steel production for the industry in 1933," said Mr. Girdler in his report, "while only 33 per cent capacity, increased about 75 per cent over the preceding year, the peak occurring in the third quarter, with a considerable recession in the last quarter. Late in December demand again improved, largely due to automotive requirements, and a gradual expansion has continued thus far in the new year. A summary of the earnings by quarters is included in the report, showing the respective results of operation for each three months period during the year.

The past year brought radical changes to business. The process of adjustment to the new conditions is still in progress. Your corporation, in common with the steel industry generally, has been a strong supporter of the NRA, and has endeavored to do its part in carrying out the Administration's constructive policies affecting business.

There has been a notable increase in cost of steel products during the last half year on account of increased wages and general commodity prices. The steel industry, in its desire to promote the national reemployment program, anticipated steel price advances which have been made subsequent to the signing of the steel code, by making substantial wage increases simultaneously with the shorter working hour schedules. Selling prices of steel products, after years of steady decline, have not risen yet to a point where an adequate return can be shown on invested capital, even with a fair rate of operations.

Early last summer the employees of your corporation adopted a plan of employees' representation in all of the mines and plants, to effectuate the principles of collective bargaining provided under the National Industrial Recovery Act. This plan has been an effective means of stabilizing labor conditions and promoting understanding between labor and management.

Production last year was: iron ore, 1,138,956 gross tons; coal, 1,349,999 net tons; coke, 1,383,623 net tons; pig iron, 1,072,277 gross tons, and Bessemer, open-hearth and electric ingots, 1,831,583 gross tons.

Shipments last year were: finished steel, 1,334,438 net tons; semi-finished steel, 103,737 net tons, and pig iron, 301,241 gross fons.

Waukesha Motor Co. Increases Wages

WAUKESHA MOTOR CO., Waukesha, Wis., manufacturer of internal combustion engines, has announced a voluntary increase of 10 per cent in all piece work and group work wage rates, effective March 1 and covering its entire force of 825 shop and office workers. This brings the wage rate to within 6 per cent of the average wages paid in 1929.

United Engineering Reports Gain in 1933

AN improved volume of business and practice of economy resulted in a profit for United Engineering & Foundry Co. last year, compared with a loss in 1932.

After all expenses, taxes and a depreciation charge slightly larger than in the preceding year, the company reports for 1933 net profit of $401,018, equal, after preferred stock dividends paid, to 82c. a share on the 416,118 shares of common excluding 7010 shares held in the treasury. In 1932, the company reported a net loss of $340,332. In 1931, net was equal to $2.13 a common share.

United Engineering paid quarterly dividends of 25c. a share on the common in 1933, continuing an unbroken annual record of dividend payments on both preferred and common stocks since its organization in 1901, and never in the history of the company has it borrowed in the form of short or long-term indebtedness. Last year net profit before depreciation

and provision for Federal income tax was $696,213, compared with loss of $77,643 a year earlier.

The reserve for depreciation set aside from earnings is held to be adequate. The statement also is presented in greater detail than has been the custom in the past.

Despite the many difficulties experienced by heavy industrial concerns in the past few years, United Engineering has kept itself in a strong financial condition. The company is a large producer of iron and steel rolls as well as mill machinery.

At the end of the year, cash alone was more than twice total current liabilities and, in addition, there were large holdings of marketable securities, mostly in the form of bonds. Total current assets Dec. 31, 1933, were $4,599,414 against current liabilities of $309,145. Included in the current assets were cash of $719,538 and marketable securities at cost of $1,348,519. These securities had a market value of $1,252,268 at the close of the year.

Suitably with the general investment trend, inventories were increased during the year to some extent.

A year earlier, on Dec. 31, 1932, the company showed cash of $445,128, marketable securities at cost of $1,659,662, and total current assets of $3,290,641 against current liabilities of $119,944. Plant additions during the past year were small and the total at which these fixed assets is carried in the balance sheet is $7,868,068, against which $3,422,328 depreciation has been charged. The company has a total surplus of $3,119,660, nearly all of which is earned.

... OBITUARY ...

THOMAS J. GILLESPIE, president of the Lockhart Iron & Steel Co., McKees Rocks, Pa., died at his home in Pittsburgh on March 2, aged 86 years. He had been in ill health since last November. Mr. Gillespie was born in Ireland, and came to this country when he was three years old, settling in New Castle, Pa. He began his business career with the Central Refining Co., and when that company was absorbed by the Standard Oil Co. he continued with the latter organization for five years at Cleveland. In 1890 Mr. Gillespie went to Pittsburgh as general manager and secretary of the Lockhart company, which had recently been organized, and had been actively identified with it since that time. He was also president of the First National Bank and the Chartiers Trust Co., both of McKees Rocks, and had been active in civic and religious affairs in the Pittsburgh district. Two sons, T. J. Gillespie, Jr., and John P. Gillespie, are identified with the Lockhart organization.

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GEORGE B. BEALE, formerly identified with the Chicago office of the Brown & Sharpe Mfg. Co., died in Oakland, Cal., on Feb. 24, aged 77 years. He first became associated with the Brown company in 1872. Mr. Beale went to Cox & Prentiss, now the Cleveland Twist Drill Co., in 1882, and from there to the Hartford Pump Co. He returned to Brown & Sharpe in 1892 as a traveling salesman in the Chicago office and had been in their employ continuously until his retirement in 1927.

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EDWARD F. MCELHEANEY, who had been associated for the past 32 years with the Central Foundry Co., New York, died of pneumonia at Muhlenberg Hospital, Plainfield, N. J., on Feb. 17, aged 58 years.

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GUY CHASE MYERS, vice-president of the F. E. Myers & Brothers Co., Ashland, Ohio, died at his home in that city on Feb. 6.

T. J. GILLESPIE

MICHAEL M. MCINTYRE, founder of Perfection Spring Co., Cleveland, now Eaton Mfg. Co., died Feb. 28, aged 75 years. He was chief spring engineer of the Eaton company until his retirement five years ago and had spent his later years in developing springs for automotive suspension. He was said to have been the first in this country to use Krupp steel. He was a charter member of the Society of Automotive Engineers.

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FRANK R. WHEELER, an enginering specialist in condensing equipment, died March 1 at his home in Chicago. He was born in Wheeler, N. Y., and was graduated from Stanford University in 1902. During his career he contributed to technical engineering publications and was a member of the American Society of Mechanical Engineers and the Western Society of Engineers.

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JOHN W. BATE, prominent manufacturer and industrialist of Racine, Wis., died Feb. 24 at his winter home in St. Petersburg, Fla., aged 70 years. Following a term as general manager of the Western Wheel Works, Chicago, manufacturer of bicycles, he joined the Mitchell-Lewis Motor Co., Racine, as chief engineer, when it commenced manufacture of automobiles in 1906. He was later made general manager. Upon the discontinuance of the Mitchell company Mr. Bate founded the Ajax Auto Parts Co., now a subsidiary of the Walker Mfg. Co., Racine, and the Rex Accessories Co.

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DAVIS A. DUCHARME, who died Feb. 26 in the railroad wreck at Pittsburgh, at one time resided in Medford, Mass. From there he went to Ansonia, Conn., and later to Akron, Ohio, where he was the representative of the Farrel-Birmingham Co., Ansonia, Conn.

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JAY G. WEISS, former president, Hyatt Roller Bearing Co., Harrison, N. J., died at Miami Beach, Fla., March 1, aged 67 years. He had been in ill health for the past two years. Mr. Weiss was born at Altoona, Pa., and following a public school education became a machinist. He became connected with the Hyatt company as works manager in 1907, and was elected president eight years later. He retired in 1923.

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ISAAC TOPPER, organizer and former president of the Topper Iron & Metal Co., Columbus, Ohio, died at his home in that city, Feb. 27.

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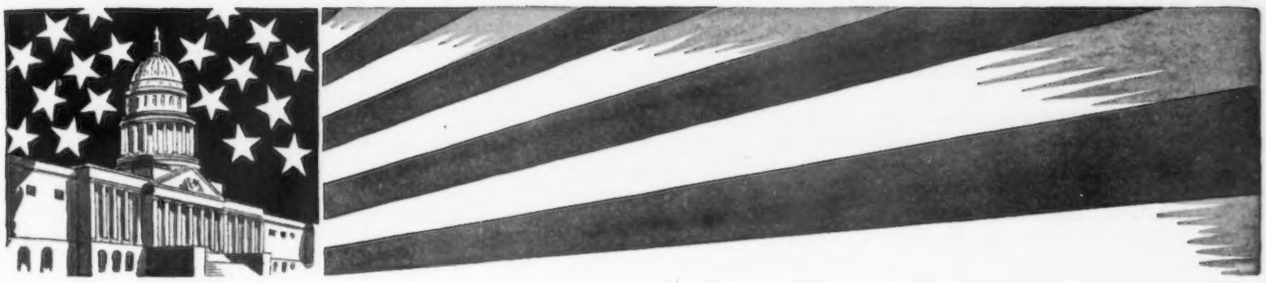
B. PERRY REMY, founder and former head of the Remy Electric Co., Anderson, Ind., died at Manning, S. C., Feb. 27, aged 57 years. With his brother Frank he established a plant at Anderson for the manufacture of electric lighting and starting equipment and other products for automotive service. The Remy Electric Co. was formed several years later. He retired in 1911 when the business was sold.

WASHINGTON, March 6.—The Interstate Commerce Commission yesterday approved an application of the Pittsburgh & West Virginia for a PWA loan of $331,500 to be used to purchase three freight locomotives.



THIS WEEK IN WASHINGTON

Code Reshaping Foreseen As Outcome of "Gold Fish" Forum

By L. W. MOFFETT
Resident Washington Editor
THE IRON AGE

WASHINGTON, March 6.—The largest gathering of American industry ever held is in session in Washington. It is meeting with the Federal Government. Tied together as never before, they are passing upon vital problems whose solution will have a profound effect on the conduct of both.

From the fishmonger to the greatest manufacturer, the city swarms with representatives of the business life of the nation. They are here by the thousands. Officially, the meeting is known as a conference of code authorities representing some 650 industries, but coming to Washington with them are large groups from those industries who are participating in open meetings or intensely watching the proceedings as "unofficial observers."

Some sharp re-shaping of codes is anticipated. This has been freely predicted by General Hugh S. Johnson, National Recovery Administrator. The Administrator, long seeing this prospect, had the impression emphasized strongly at the meeting last week when the general public had its "field day" of criticisms, criticisms that ran the gamut all the way from minor to major points. Some have been cast aside, but out of the large grist many have been seriously considered by the NRA and listed and laid before the code authorities. They often fit in with material that the NRA itself has been working on. Others are supplementary. Taken together they make a huge pile of "dead cats."

The field day was meant for this purpose. Itself a large gathering from many walks of life—labor, consumer, social worker, communist, socialist, etc.—there was naturally a wide range of species of dead cats that filled the air. Some were simply odorous. But others were more than that. They are being taken into reckoning both by the NRA and the code authorities and are the subject of both serious and vigorous discussion.

The code conferences have been coordinated by subjects as were the public conferences of last week. They were made up of five groups. Subjects covered are employment, trade practices, (the latter in two phases); code authority organization and smaller enterprises and minorities. So broad is each subject that the five together include all features of code operation. This was made strikingly evident from the discussions that centered about the topics at the "field day" gathering. Therefore it is natural that the code conferences are taking a similar trend.

Outstanding Subjects

Outstanding subjects developed at the "field day" gathering which may bring about marked changes in codes concerned alleged violations of the labor provisions of the Recovery Act, failure of the NRA to enforce compliance with codes, and consumer attack on alleged price fixing. There was some talk at the meeting of organized consumer resistance to increased prices, and even more of it was heard at informal gatherings in corridors and halls of the hotels and the Department of Commerce auditorium, where the sessions took place last week and are being held this week.

General Johnson himself, in opening the field day meeting, presented 12 definite suggestions for code changes, that give a clear picture of some of the subjects being considered by the code authorities.

Twelve "Corrective Points"

These 12 "corrective points," as General Johnson calls them, are to receive immediate attention, he announced. They are:

1. A more uniform and equitable rule of national price stabilization in those cases where it is necessary to maintain wages at a decent standard against the certain results of predatory and cut-throat competition, and further insurance against increase of price faster and further than increase of purchasing power.
2. A more effective rule on costs for the purposes of maintaining rules against sales below costs of production.
3. Uniformity of wages and hourly rates in competitive industries.
4. Uniform classification of areas for the purpose of the North-South differentials.
5. Further reductions in hours per week and further increase in hourly wages.
6. Certainty of protection against monopoly control and oppression of small enterprise, and, especially, the inclusion in codes of adequate buying (as well as selling) provisions to guard against oppression of small business.
7. A much improved method for securing prompt and effective compliance.
8. A safe method of financing code administration without racketeering and abuse.
9. Elimination of inconsistent or conflicting provisions among various codes.
10. Adequate labor and consumer representation in an advisory capacity on Code Authorities.
11. Uniformity of governmental representation on Code Authorities.
12. Wider use of mechanism for settling labor disputes in connection with Code Administration.

The plan of General Johnson is to determine at the code conference how

many of these changes can be put into effect by general Presidential rulings, "leaving to each industry the opportunity to show why the application of such rulings cannot, or ought not to, be applied to it, or to what extent such rulings ought to be modified or stayed."

It will be seen that General Johnson is hoping to effect these changes without legislation. He is seeking to have them made by Presidential action.

Boiling his suggestions further, however, the General has stated that the five principal problems of the NRA are:

1. Insurance that price increases do not outrun wage increases.

2. Prevention of industrial or labor control against the public interest.

3. Compliance.

4. Insurance of the statutory rights of labor.

5. Maximum contribution by NRA to the solution of the purchasing power and unemployment problems.

General Johnson submitted this summary in passing upon the "field day" meeting of the public. He said that the heads of useful criticism did not exceed the 12 points he proposed, but acknowledged that a wealth of detail and information prepared NRA for the code conference.

Lax Enforcement Claimed

Many who are in entire accord with the purposes of the NRA attacked it as being lax in enforcement of codes, for its inability to stop price chiseling, for permitting price fixing, labor violations, which can be brought under the jurisdiction of the National Compliance Board, an integral part of the NRA. Some went so far as to charge that the NRA really had collapsed and no longer is taken seriously either by the public at large or industry. Unquestionably, there were exaggerated statements made, but many of them are, despite outward appearance of indifference or resentment on the part of NRA officials, receiving serious attention. These things will have to be considered in that spirit at the code conference.

The loudest protests came from labor. Consumer spokesmen were also unusually conspicuous, a thing held to be significant in view of growing talk of organization to set up buying resistance. As for labor complaints, many construed them as meaning further force that will eventuate in shorter hours, in some cases, higher wages, and quicker compliance. The voice of the consumer was taken to strengthen attack against price provisions which are now carried in many codes. Even the recently proposed "price formula," roughly based on the idea of the "lowest reasonable cost," is being frowned upon by many consumers. It is being given its first try in the retail coal code.

But if all these things are to be enforced upon code authorities for recommendation to their industries the query is being raised as to whether they would have further interest in codes inasmuch as the principal remaining benefit would be reflected through fair trade practices. Some codes do not even carry these provisions.

Led by President William Green of the American Federation of Labor, organized labor emphasized its demands for shorter hours and did not exempt the heavy industries, though General Johnson has indicated that not much can be done in this direction in the heavy industries.

"The hours of labor must be still further reduced," Mr. Green declared. "There is no choice in the matter. Revival of the heavy industries must not be made at the expense of exploitation of labor. If we want to reduce the cost of production, we can reduce independent labor costs."

Policing of codes by organized labor was asked by Elinore M. Herrick, acting chairman of the New York Regional Labor Board. She declared that compliance and enforcement are the greatest problems facing the NRA. Solving this problem, she contended, cannot and will not be done by industry. Her demand for policing of codes by organized labor is not new. It was made by President Green when he appeared at the hearing on the steel code. Revival of the demand, however, was looked upon as being significant of the drive of organized labor in NRA activities which has come simultaneously with introduction in Congress of the Wagner-Connery bill which would set up a permanent National Labor Board, be empowered to settle labor disputes, abolish company unions and give labor great powers for collective bargaining.

Edward F. McGrady, NRA Assistant Administrator for Labor and Assistant Secretary of Labor, advocated Federal and State licensing and registration of so-called undercover men or "labor spies." This proposal was made after numerous attacks on various industries which were charged with maintaining a system of espionage against organized labor activities in their plants. Walter Cooke, representing office employees of Brooklyn, recommended that a trade union division be set up in the NRA to function like the Trade Association Division now in existence. Mr. Hewitt, speaking for A. O. Wharton of the International Association of Machinists, requested the reopening of many codes to insert stipulations that would improve the lot of the skilled worker. He said the tendency under codes is to pay the minimum wage, fixed for unskilled labor, to skilled men. Mr. Hewitt also proposed the banning of all code wage differentials, whether for sex, geographical location or any other reason. Like other spokesmen for organized labor, he urged the 30-hr. week.

Labor Criticisms

John P. Frey, secretary of the Metal Trades Department of the A. F. of L., said the 30-hr. week should be adopted. Under present hour provisions in codes, Mr. Frey said, it is his opinion that only about 2,000,000 have been returned to work. He said that even were all industries under 40-hr.-week codes there would still be from 8,000,000 to 10,000,000 unemployed, especially in view of the advance in the industrial arts and increased effects of technological improvements during the depression.

Extremely caustic in his criticism of NRA and threatening an "old-fashioned strike" if NRA does not function, Matthew Smith, Mechanics Educational Society of America, Detroit, expressed the hope that the hearing would "reveal the disillusionment of the general public with the NIRA.

"I suppose there is some good to the employees in the NRA, but it is difficult for me to find it," he declared.

Mr. Smith centered his complaints on the automobile code, while remarks such as he made were uttered in substance by others in referring to a wide range of other industries, including steel, textile, furniture, etc. The remarkable thing is that, with rare exceptions, these remarks, whether coming from outright radicals or labor representatives affiliated with the more conservative organizations, went unchallenged. This in the face of the fact that many industrialists attended the hearings and heard the remarks. Apparently they did not want to engage in disputes, perhaps considering it a futile effort to do so. Among the few challenges to the position of organized labor for sharp wage-hour reductions was one which came from Ray M. Hudson, Boston, secretary of the Industrial Committee of the New England Council. Mr. Hudson filed a brief with NRA officials registering "serious objections to any statutory reduction of current hours of work in industry by act of Congress or any administrative blanket reduction of hours through the NRA."

Open Prices Seen Doomed

With regard to prices, the meetings developed further the belief that open price provisions in many of the codes are doomed. It is certain the "waiting period" will be out of the picture if present policies are continued, as they likely will be. These provisions were vigorously attacked at the hearings last week. One of the leading critics of this practice is Dr. Leon Henderson, former professor of industrial economics at the University of Pennsylvania and Carnegie Tech. Because he has been a critic of NRA, General Johnson made Dr. Henderson chief of the NRA division of Research and Planning. He is now on leave of absence as director of consumer credit research for the Russell Sage Foundation. He is completing an NRA report which is expected to recommend sweeping revision of the open price sections

of codes. Divisional Administrator Whiteside has also suggested revisions in price clauses.

The consumer was more articulate than is generally characteristic of him and it is probable that the public meetings have given to the Consumers' Advisory Board a higher status than it has previously enjoyed. It has been rating rather low as an NRA unit, though it is clear General Johnson himself has been moving more actively in behalf of the Consumers' Advisory Board, for many protests against sharp price rises, with lagging purchasing power, have reached the NRA. That this is having its effect is shown by recommendations made by Administrator Johnson for code changes.

There was seen outside of the meetings rather than in them a sentiment toward consumer-organization, a perhaps difficult effort, and one that would not likely be closely coordinated. But talk of "buyer resistance" was rather free. One current of thought was in the direction of buyers setting up a system informing each other of the maximum price they would pay, with an appropriate waiting period, so that all could depress the price together. This was suggested as a means of combating the "waiting period" provided in price provisions of codes.

All in all it was a melange of criticism—this public meeting. And out of it will come some important changes at the code authority conference.

Executive Order Strengthens Labor Board

WASHINGTON, March 6.—Further strengthening of the power of the National Labor Board is seen in the executive order issued last Saturday by President Roosevelt. By this order the Labor Board is given a status equal to that of the National Compliance Board and the right to review rulings of the Labor Board are removed from the Compliance Board. The Labor Board, never an integral part of the NRA, thus contrasting with the Compliance Board, is removed even further from the Recovery Administration and given greater authority and wider independence. Its rulings now, when turned over to the Compliance Board, will be subject to immediate enforcement rather than to review and delay, provided its rulings can survive court tests where tests are demanded.

There long have been differences between the two boards, and they are understood to have been thrashed out at a recent meeting of the cabinet following a conference held between National Recovery Administrator Hugh S. Johnson and Secretary of Labor Frances Perkins.

Trys Out New Powers

The National Labor Board, eager to try out its broadened authority, immediately issued an order against four companies by calling upon them to show cause why their cases should not be cited to the Department of Justice for immediate action. The Labor Board in the past has shown irritation toward the Compliance Board in reviewing the former's rulings. This was notably true of the Budd Mfg. Co. case. The Compliance Board, however, last week followed the rulings by proposing that a ballot be prepared and an unrestricted referendum vote be taken of the Budd employees to determine whether they desire to set up any form of self-organization.

Secretary Perkins has consistently held that rulings of the National Labor Board should not be the subject of review by the Compliance Board. She took the position that it was the duty of the Compliance Board to enforce decisions of the National Labor Board. The Presidential order meets these points. General Johnson is reported to have said that the Compliance Board might review National Board decisions and act upon its own findings, though it is said he was not insistent upon his position.

Senator Wagner Pleased

Senator Wagner, chairman of the Labor Board, was pleased with the Presidential order:

In a statement, he said:

"This order means that the board can act directly, promptly and effectively in case of violation of Section 7 (a) (collective bargaining provisions of Recovery Act). Today the board acted immediately under this order and will continue so to act.

"At the same time, the President has appointed three additional members and two vice-chairmen, thus enabling us to carry out a panel system to expedite consideration of cases. Altogether the National Labor Board is now in system to deal expeditiously with that small minority of employers who violate the self-organization and collective bargaining rights of labor.

"In the reports from the Regional Labor Boards just put before me there is a total of over 8000 separate reinstatements of workers discharged through discrimination and put back on their jobs by the boards. I wish to emphasize that cases of this kind should be taken promptly to the Regional Labor Boards, and with our new facilities for rapid action they will be dealt with directly."

The new executive order modified one of Feb. 1 and reads as follows:

"Executive Order No. 6580 of Feb. 1, 1934, is hereby amended by striking out paragraph numbered 2 thereof and inserting in its stead the following paragraph:

"2. Whenever the National Labor Board shall find that an employer has interfered with the board's conduct of an election or has declined to recognize or bargain collectively with a representative or representatives of the employees adjudged by the board to have been selected in accordance with Section 7 (a) or has otherwise violated or is refusing to comply with Section 7 (a), the board, in its discretion, may report such findings and make appropriate recommendations to the Attorney General or to the Compliance Division of the National Recovery Administration. The Compliance Division shall not review the findings of the board but shall have power to take appropriate action based thereon."

Labor Board Membership Increased

WASHINGTON, March 6.—In order to insure regular attendance of both industrial and labor members at its meetings, President Roosevelt has increased the membership of the National Labor Board from eight to 13. He has also named two vice-chairmen who may preside in the absence of Chairman Robert F. Wagner who often is not able to attend meetings because of his Senatorial duties. The added personnel is partially a reorganization of the board that has been urged for some time. The two new vice-presidents are Clay Williams, Winston-Salem, N. C., and Leon Marshall, economist, of Baltimore. The three new industrial members are Ernest Draper, Brooklyn; Henry Denison, Framingham, Mass., and Gerard Swope, New York.

Clapp Co. Celebrates Seventieth Anniversary

E. D. CLAPP MFG. CO., Auburn, N. Y., celebrated its 70th anniversary in February of this year. This company, which makes all types of drop forgings for motor cars, trucks, tractors and other purposes, was founded in 1864 by the grandfather of the present president. It was incorporated in 1876 under its present name.

The present officers of the company are: E. D. Clapp, president and treasurer; H. W. Clapp, vice-president; E. A. Clapp, assistant treasurer; R. G. Brockway, secretary, and W. R. Steele, assistant secretary.

Wagner Bill To Be Bitterly Contested

Attempt to "Close Shop" American Industry and Deliver It To Organized Labor Arouses Storm of Protests

WASHINGTON, March 6—The Wagner bill to set up a permanent National Labor Board and abolish company unions has aroused a storm of protests from industries all over the country. Passage in its present form will be bitterly contested. Drafted by Senator Wagner of New York as the result of his experience as chairman of the National Labor Board, the measure has been described by General Counsel James A. Emery of the National Association of Manufacturers as the "most amazing legislative proposal laid before the Senate during the 30 years I have had the opportunity to examine and analyze proposals in that body affecting the industries of the United States. An identical bill has been introduced in the House by Representative Connery of Massachusetts, chairman of the Committee on Labor. It has been referred to the latter committee on the House side and to the Committee on Education and Labor on the Senate side.

Strongly supported by the American Federation of Labor, Mr. Emery expressed the opinion that it will wake people up to the extremity to which "we are going to put the Government at the service of one group." Declaring the measure to be so plainly unconstitutional for many reasons too obvious to mention, Mr. Emery said it would wipe out the rights of the people and destroy good will and understanding between industry and labor without which, he said, the country never will return to recovery.

Speaking of punitive powers provided in the measure, Mr. Emery said it erects a great body of offenses on employers but not on "the other side" and added that, while there should be no coercion or compulsion if it is applied to one side it should also be applied to the other.

Mr. Emery said he thinks the President and others in the administration have clarified the Recovery Act but that now the American Federation of Labor is by appeal to the people trying to put in compulsory features. It was charged by Mr. Emery that the Wagner-Connery measure abrogates interpretations given of Section 7 (a) of the Recovery Act, relating to the right of employees to join or refrain from joining any labor organization without interference for the purpose of bargaining collectively.

Company Unions Abolished

The measure has been vigorously attacked from many angles. One of the sharpest assaults is against Section 304 (b) which would abolish the thousands of company unions, and steel and automobile manufacturers in particular are preparing to answer this feature of the bill especially, as well as others. It is likely they will take advantage of the meeting of code authorities to pay their respects to the measure. The bill was introduced simultaneously with the National Labor Board decision returning the Weirton Steel Co. case to the Department of Justice "with recommendation for immediate action," and also during the public meetings on the NRA when employers were strongly criticised for alleged violation of Section 7 (a), for disregarding National Labor Board decisions, for maintaining espionage systems, etc. These charges were freely made and have built up lively resentment among employers. The steel and automobile industries were singled out more than any other industries for the assaults coming from labor, mostly organized labor representatives.

Section 304 (b), known as the anti-company union provision, says that "any term of a contract or agreement of any kind which conflicts with the provisions of this act is hereby abrogated, and every employer who is a party to such contract or agreement shall immediately so notify his employees by appropriate action."

That this clause is intended to do away with all company unions is held to be clear in view of previous provisions which make illegal every form of company union in which the employer has any connection.

Industrialists Aroused

Industrialists have widely criticised the National Labor Board as being controlled by the American Federation of Labor and with the Wagner bill proposing a permanent board with vastly greater powers, they were deeply aroused, and were further irritated by the board's decision of last Friday in the Denver tramway case. They said this finding supported their claim that the board is partial to labor for it held that any agreement reached between the Amalgamated Association of Street and Electric Railway Employees and the management must apply to all employees. An election had been held to determine "whether the employees desire as a collective-bargaining agent the Association, an outside union, or the Employees Representative Committee, the so-called company union through which they had been bargaining. The association won 353 to 325, with the result that it claimed, and was upheld by the board, the right to become exclusive bargaining agent for all employees. The board's ruling sustaining this right is held to be in direct conflict of interpretation of Section 7 (a) of the Recovery Act made in a recent joint statement by General Johnson and Donald Richberg of the NRA. The decision was the object of dissent by Pierre S. duPont, a member of the Board, who recommended that both the association and the committee be empowered to bargain for the employees they represent. He further recommended that the 36 employees who did not vote should be allowed to bargain individually with the company.

Employer Stripped of Power

Mr. Emery said the Wagner-Connery bill would strip the employer not only of the power to bargain but of the power to negotiate directly with his own employees.

He pointed out that the National Labor Board, as indicated by the title of the bill, is to be authorized by statute as a permanent agency for two major purposes. The first is "to equalize the bargaining power of employers and employees." The second purpose is "to encourage the amicable settlement of disputes between employers and employees."

"A careful examination of the bill would lead any impartial reviewer to the conclusion that the terms of the bill contradict the declared purposes," said Mr. Emery, "and that the measure is as well designed as would be possible not to encourage the amicable settlement of disputes, but to encourage disputes, and not to equalize the bargaining power of the parties affected, but to confer upon one

of the parties, namely, the employees, a monopolistic power, which, with the constant assistance of the National Labor Board contemplated by this bill, would effectually strip the employer of the power to negotiate directly with his own employees in the interest of industrial harmony and continuity of industrial operation.

Bill Divided in Two Parts

"The bill is divided into two major parts. A national labor board composed of seven members is to be appointed by the President. First, the bill creates a statutory offense described as an 'unfair labor practice.' This is apparently modeled on the Federal Trade Commission Act which prohibits 'unfair methods of competition.' But there the analogy ends, for the acts specifically classified as unfair labor practices under the Wagner Bill and the power thereafter conferred upon the National Labor Board are such as to ignore all precedent, to condemn acts not heretofore regarded as unfair, unlawful, or, in the language of the courts 'characterized by fraud, deceit, or oppression.'

"Furthermore, the powers given the National Labor Board are more drastic than those now or heretofore possessed by any other agency of the United States Government either in time of peace or in time of war. No court of the United States possesses the powers sought to be conferred upon the National Labor Board in respect of compeling the attendance of persons, the production of books, papers, and records, and the modification of its own rules at any time during the course of proceedings; and if the board cannot convict a party of the offense charged in the complaint, it may nevertheless convict him of any other offense which may be disclosed during the course of the hearings.

"The penalties of this bill operate exclusively against the employer. Section 5, which enumerates those things which shall constitute unfair labor practices, does not, in a single instance, impose any obligation on employees or labor organizations, and the board is not authorized to issue any order of any character against labor organizations with respect to any of the conduct which is described as 'unfair labor practices.'

Labor Exempted from Responsibility

"In fact, so careful has the author of this measure been to see that it operates against the employer only and to exempt labor organizations from all liability or responsibility, that he has defined the term 'employer' to mean any person who has one or more employees 'except . . . any labor organization, or any one acting in the capacity of officer or agent of such labor organizations.'

"Furthermore, Senator Wagner has placed a premium on strikes in at least two major respects. He first provides that the term 'employee,' as used in the bill, 'shall not include an individual who has replaced a striking employee.' He also provides that 'nothing in this act shall be construed so as to interfere with or impede or diminish in any way the right to strike.'

"The measure has been so phrased as to make it impossible for any employer to know in advance what acts constitute a violation of Section 5 of the bill. In every instance the conduct prohibited is described in such vague and general terms that the question of whether the employer has or has not complied is, as a practical matter, left to the discretion of the board, and the exercise of this discretion is duly reenforced by a later provision that the findings of the board, 'if supported by evidence, shall be conclusive.' This provision is clearly intended to make possible a conclusive finding on the basis of what is known in law as a mere 'scintilla of evidence'—in other words, on mere suspicion.

"Under Section 5 of this bill, any friendly or social contact between an employer and his employees might well be held by the board, in the light of the expressed views of its present chairman, to constitute an 'attempt' to impart the right of employees with respect to concerted action so carefully and vaguely described in Section 4 of the bill.

Board Made Full Judge

"The board is made the sole judge of whether the employer has failed 'to exert every reasonable effort' to make and maintain certain agreements with representatives of his employees. The mere fact that such agreements did not come about as a result of demands made by labor representatives, might well be treated by the board as prima facie evidence that the employer had failed to 'exert every reasonable effort.'

"Although Senator Wagner, on the one hand, has defined a labor organization to include any kind of society or association in which employees participate, he has, on the other, largely canceled this definition so as to forbid any participation or 'influence' (whatever that word means) by the employer in the initiation, supervision, operations, policies, or elections of any or all of his employees, and has forbidden the employer to even consult with his employees with respect to the form of organization, constitution or by-laws. Thus, any form of employee organization which contemplates conference between employer and employee, is forbidden, and the term 'labor organization,' for all practical purposes, means what is commonly known as a labor union.

"Under the sixth paragraph of Section 5, any act of management in employing, advancing, fixing the compensation of, or fixing the wage or hour differentials between employees might be held by the board to be a violation of the law as a 'discriminatory practice' with respect to other employees or others seeking employment.

"Furthermore, while the bill provides that the employer may not encourage membership or non-membership in any labor organization, that provision is followed by a specific provision in Paragraph 6 of Section 5 to the effect that *an employer and a labor organization may agree that a person seeking employment shall be required, as a condition of employment, to join such labor organization.* Thus, while the employer could not make it a condition of employment that an employee or one seeking employment *refrain from joining* a labor organization, he would be authorized under this bill to make it a condition of employment that the employee *join* a labor organization.

Impartial Inquiry Urged

"The manufacturers of the country urge an impartial inquiry which will present the actual facts of existing relations, developed in many forms over a long period of time, and an ascertainment of the attitude of the nation's workers, determined in the light of their own judgment and experience. Recovery legislation has been in effect but nine months. The need for haste in enactment does not apply to amendment. Time should now be taken to ascertain the facts suggested, the authority of Congress and the quality and operating effect of the present administrative agencies, before drastic amendment is seriously considered.

"The impression is constantly but erroneously created that the only coercion existing in the field of employment relations is that alleged to be exercised by the employer over his employees. Any further legislation which is not predicated on inquiry into other demonstrable forms of coercion against employees, employers and the public by labor combinations will disregard our social history and experience, the familiar facts of our daily life and be grossly unjust to employers, employees and the people."

Code Authorities Named

WASHINGTON, March 6.—Administrator Hugh S. Johnson has recognized industry members of code authorities for the copper and brass mill products and malleable iron industries, as follows:

COPPER AND BRASS MILL PRODUCTS INDUSTRY: Chairman—E. O. Goss, president, Scoville Mfg. Co., Waterbury, Conn.; vice-chairman—F. S. Chase, president, Chase Brass & Copper Co., Waterbury, Conn.; secretary—C. D. Dallas, secretary and treasurer, Revere Copper & Brass, Inc., New York; John A. Coe., Sr., president, American Brass Co., Waterbury, Conn.; R. E. Day, president, Bridgeport Brass Co., Bridgeport, Conn.; Berthold Goldsmith, president, National Brass & Copper Co., Lisbon, Ohio; and F. L. Riggin, vice-president, Mueller Brass Co., Port Huron, Mich.

MALLEABLE IRON INDUSTRY: R. R. Fauntleroy, Moline Malleable Iron Co., St. Charles, Ill.; E. E. Griest, Chicago Railway Equipment Co., Chicago; L. M. Eyke, Terre Haute Malleable & Mfg. Co., Terre Haute, Ind.; J. G. Malnoski, Muncie Malleable Foundry Co., Muncie, Ind.; John C. Haswell, Dayton Malleable Iron Co., Dayton, Ohio; A. F. Jackson, Michigan Malleable Iron Co., Detroit; Carl C. Gibbs, National Malleable & Steel Castings Co., Cleveland; R. N. Cole, Canton Malleable Iron Co., Canton, Ohio; C. L. Berger, Eastern Malleable Iron Co., Naugatuck, Conn.; H. L. Steeves, Rhode Island Malleable Iron Works, Hillsgrove, R. I.; T. F. Hammer, Malleable Iron Fittings Co., Brannford, Conn.; and P. R. Vanduyne, Meeker Foundry Co., Newark, N. J.

Large Authorizations for Car and Rail Buying

WASHINGTON, March 6.—The Interstate Commerce Commission has authorized the New York, Chicago & St. Louis and the Chesapeake & Ohio railroads to issue equipment trust certificates amounting to $5,028,000 and $16,876,000 respectively in connection with the procurement of equipment. Money for purchase of the equipment has been loaned by the Public Works Administration.

The Nickel Plate will purchase 1200 freight cars, 15 freight locomotives, five switching locomotives, 20 extra locomotive tenders, seven passenger coaches and one mail car. The C. & O. will purchase 7800 steel freight cars, 15 steel passenger coaches and 11 steel mail and express cars.

Last Thursday, Public Works Administrator Harold L. Ickes announced he had signed three more contracts for railroad loans totaling $12,693,000. This put under contract $146,889,000 of the $196,607,800 allotted by the PWA for railroad loans.

The three contracts were for loans of $10,000,000 to the Illinois Central for purchasing rails and cross ties, overhauling locomotives and cars, replacing bridges and repairing a tunnel; $1,481,000 to receivers of the Wabash for purchasing rails and fastenings and rebuilding freight and passenger cars and $1,212,000 to the Lehigh Valley for the purchase of 500 new freight cars.

The Illinois Central will spend $1,437,143 for 21,600 tons of rails, 6733 tons of fastenings and other materials. The company will use another $1,252,100 of the loan for replacing and repairing structures. The Big Clifty viaduct, located near Big Clifty, Ky., will be replaced with a new steel trestle at a cost of $167,000. Material will cost $100,000. The approaches to the Cairo bridge across the Ohio River between Cairo, Ill., and East Cairo, Ky., will be renewed at a cost of $870,000, of which $290,000 will be for steel. Tunnel No. 3, near Reevesville, Ill., is to be relined with reinforced concrete at a cost of $215,000 of which $33,000 will be for reinforcing bars. The balance of the loan, $7,310,855, will be spent on repairing and overhauling 12,645 freight cars, 184 passenger cars and 148 engines in the Illinois Central's own shops. Materials will cost $4,961,000.

The company will complete its construction and rehabilitation program this year.

Receivers of the Wabash will use $564,706 of the loan of $1,481,000 to purchase 10,000 tons of rails and 4100 tons of fastenings, together with frogs, switches, etc. The remainder of the loan will be used for rebuilding and repairing 1425 freight cars and two passenger cars and applying air-conditioning apparatus to 10 passenger cars. Work on the equipment rebuilding program will be done at the company's shops in Decatur, III.

The Lehigh & New England will use its loan of $1,212,000 to purchase 500 freight cars, of which 100 will be built by the American Car & Foundry Co., at Berwick, Pa., 150 by the Pressed Steel Car Co. at Pittsburgh and 250 by the Magor Car Co. at Passaic, N. J.

Mr. Ickes also has announced that a payment of $300,000 has been made to the Lehigh Valley railroad as the first installment on its loan of $2,000,000 for rebuilding 1000 box cars and 60 locomotives in its shops at Sayre, Pa., and rebuilding 1000 coal cars in its shops at Packerton, Pa. The company has advised the PWA that it will require the balance of the $2,000,000 in monthly installments between now and July to meet payrolls in its shops and to pay for materials purchased.

The Interstate Commerce Commission has denied the application of the receiver of the Waco, Beaumont, Trinity & Sabine Railroad for approval of its maintenance and equipment program. The carrier had sought a loan of $5,000,000 from the PWA.

Weirton Case Referred to Department of Justice

WASHINGTON, March 6.—The National Labor Board in shunting the Weirton Steel Co. case back to the Department of Justice has recommended that the Attorney General "take immediate action" and in the meantime is seeking greater power as evidenced by the bill introduced by Senator Wagner, chairman of the board. The bill is accepted by many as an admission that the Labor Board has no jurisdiction in the Weirton case, thus sustaining the claims of President Ernest T. Weir who has persistently stood against jurisdiction by the board over a poll by workers to determine whether they desired another election. Mr. Weir has maintained that it would be unfair to workers who at an election chose an employee agency outside of the Amalgamated Association of Sheet, Tin and Iron Workers. The latter organization has been pressing the case against the company. The company's position is being stoutly upheld by the entire iron and steel industry through the American Iron and Steel Institute.

The Weirton case was once before referred to the Department of Justice. This was last December when Mr. Weir refused to permit the Board to supervise an election in company plants, an election having been held in September.

No action having been taken by the Department of Justice representatives of the association called upon President Roosevelt. Shortly thereafter the President issued an order, apparently in response to the request of the workers, empowering or seeking to empower, the board to poll workers. The steel company refused to give representatives of the board its payroll. The upshot was the action in again referring the case to the Department of Justice. The board resolution providing for this course was signed by all board members except Leo Wolman. Mr. Wolman was absent from the meeting at which the resolution was adopted. Nevertheless the omission of his name is considered significant. For it is known he has been dissatisfied with the board's proceedings in the Weirton case. This is held to have been responsible for his recent resignation from the board. Later at the request of Senator Wagner he withdrew his resignation but it is said he proposed again to leave the board. It is reported that Mr. Wolman, though altogether favorable to labor, doubts the jurisdiction of the Labor Board in the Weirton case. In making public the resolution, Senator Wagner said, "It was the unanimous decision of the board that no other course was left but to recommend action by the Department of Justice." Apparently Senator Wagner overlooked the fact that Mr. Wolman was not present at the meeting. Signers of the resolution are Robert F. Wagner, W. C. Teagle, Pierre duPont, William Green, John L. Lewis, Frances Haas and George L. Berry.

The board withdrew a statement that it had found that "a substantial number of workers wanted an election."

The board on Tuesday of last week heard representatives of the Amalgamated Association of Iron, Steel and Tin Workers in connection with their complaint of alleged discrimination and discharges for union activity at the plants of the Great Lakes Steel Corpn., Ecorse, Mich. The company was not represented at the hearing.

Consumer Advisory Board Recommends Abolition of Basing Points

Would Also Establish Huge Bureaucracy To Handle Prices and Costs

WASHINGTON, March 6.—Elimination of the present basing point system in the iron and steel industry and the substitution of what would amount to an f.o.b. system is recommended in a report of the Consumers' Advisory Board to National Recovery Administrator Hugh S. Johnson. The report was released yesterday in order that it might be submitted to the code authority conferences now under way.

Other sweeping changes are recommended by the Advisory Board. It proposes total elimination of price fixing; alteration of the open price system so that data instead of being filed with code authorities would be submitted confidentially to a governmental agency; governmental supervision of cost accounting to establish minimum prices; limitation of production, and a governmental agency to deal with complaints of price chiseling by large buyers rather than by a general system of price differentials. Many other recommendations also are made and are so broad that they would give an entirely changed complexion to the NRA and the system of operating under it. By some the report has been pronounced as proposing tremendous governmental bureaucratic control of industry with but little semblance of industrial self-control remaining.

Dealing with basing points, zone freight systems and other systems of dividing the market, the report, based on recent public hearings before the board, said that specifically it has asked information about the steel and lumber industries in an effort to discover whether existing basing point systems avoid alleged abuses. The information sought relates to the amounts of products made by each producing center and the points to which this production is distributed.

"We recommend that, as soon as this information is available, all basing point systems, zone freight systems and other systems dividing the market be reconsidered in the light of the facts and that any changes be made which may then seem desirable," says the report. "We suggest that the principle underlying such changes should be to establish as nearly as may be practicable in each case, a system in which each market is served by its nearest sources of supply and in which the freight charged corresponds to the freight actually paid.

Raps Open Price System

"Though, of course, willing to be guided by the facts when they become available, we feel that the present danger of having prices outstrip increased wage payments makes it peculiarly undesirable to experiment further with price systems of this general type. The history of such systems, as provided in studies of steel and cement by the Federal Trade Commission, supports suggestions made above which is especially urged in cases where no such system has in fact existed before the introduction of a code."

The board conceded that it was not prepared to deny that these systems may be needed and used fairly in some industrial situations, but said their history is one of grave abuses. It was declared that there is abundant evidence to show that in the past such systems have been used to load upon the consumer charges for imaginary freight and to confront him with a system of arbitrarily uniform delivered prices. It is charged that they have fostered discrimination between one buyer and another and uneconomic cross hauling of goods as well as production at uneconomic points.

"Since there is such a strong case against them, we believe that devices of this type should be permitted only under peculiarly close scrutiny by the Administrator to guard against potential abuses," the board reported.

It proceeded to say that thus far it has been able to obtain no information sufficiently detailed to determine to what degree the basing points established permit the alleged abuses mentioned. Evidently, it is stated, the code authorities themselves do not have this information. For this reason, the board urged that in all cases where there are basing point systems, etc., each code authority be instructed to compile immediately the information which the Division of Research and Planning may think necessary to an appraisal of the economic significance of the particular system of dividing the market used in the code.

After warning that further increases in retail prices this spring will overcome increased purchasing power of industrial workers and farmers, the report says that evidence indicates that arrangements to fix uniform prices have been made in the case of numerous products, sometimes locally, sometimes nationally, sometimes with code sanction and sometimes without. Among cases in point which are mentioned are machinery and tools, steel and fabricated metal products, electrical equipment, lumber, etc. It is also declared that evidence indicates that a number of industries have increased prices more than can be justified by increased wage payments under the NRA. In such cases it is declared that the President's suggestion that price increases be deferred even at the expense of full initial profits has been overlooked in what appears to be "an understandable eagerness to recoup heavy losses of recent years." No steel or allied lines are included within this category. It is added, however, that while the board's knowledge of the development is relatively limited, there still remains no reason to believe that the industries mentioned include all of those which have failed to expand mass purchasing power. The board by indirection suggests that its staff be enlarged in order to take up these and related studies.

It was pointed out that provisions which should be critically re-examined include those relating to open price systems, cost provisions and cost accounting systems, restriction of output by allocation or by limitation upon machine hours of plant operation, or upon the installation of new machinery, systems for artificially determining freight charges and market areas, arrangements to establish fixed price differentials for different classifications of customers, resale price maintenance and specific code authorization of price fixing.

Striking out for elimination of price fixing, the board proposes that actual prices charged in sales already made be reported to an NRA agency pledged to keep the detailed reports confidential and to supply to members of the industry only statements of the range of prices at a given time. That this agency would supplant code authorities in handling prices is made clear from the board's statement that if the reported prices indicate the ex-

istence of questionable conditions it believes that remedies can best be applied by an NRA agency rather than "by those who have private interests at stake." It charges that the basic difficulty of the open price system is that they, with or without waiting periods, identify the person or firm quoting the low price and thus facilitate the use of pressure to force his price up to the level generally desired in the industry. The board by this observation criticizes the recent policy of the NRA itself which provides that prices shall become effective immediately upon being filed. This policy has been adopted in newly approved codes and pending codes while a study is being made with a view to elimination of the waiting period from all codes.

Attacks Reasonable Cost Provision

In passing upon the provision against selling below cost, the board again attacks a recent formula adopted by the NRA. This concerns permission given the code authority, when it finds its industry is confronted by an emergency, to determine "the lowest reasonable cost for the products of this industry." This formula was first incorporated in the code for the retail coal industry and the code authority for that industry has already declared it to be its opinion that an emergency exists in every retail coal area and authorizes divisional code authorities to institute investigations. The lowest reasonable cost is to serve as a basis for minimum prices, sales below which constitute an offense against the code. The Advisory Board said it believes that this policy, in addition to making emergencies attractive to industry, may have the effect of permitting the establishment of uniform minimum prices in all cases where it is adopted by industry. At some length the board dwells on the charge that the costs would be padded, though it does not use that blunt word.

In then sets up its own general proposition to cover cost, as follows:

1. Individual cost rather than average cost for an industry should be used; and the provision that there may be sales below individual cost to meet competition should be applicable in all cases.

2. For each industry a formula for determining cost by each individual concern should be carefully defined and approved by an agency of the NRA, especially equipped to deal with such problems, and to supervise continuously the working cost formulas and cost accounting systems.

3. Such a formula should include actual outlays for labor and materials, both direct and indirect. It should not include selling expenses or financial costs, or a larger proportion of the actual total overhead than the ratio of the present output to the normal output of the enterprise—normal to be taken as the average output for a period of years.

The board said these limits are based upon the assumption that the cost provisions are intended to set the lowest permissible limit to price cutting rather than to guarantee operation at a profit and that they therefor apply only on periods when distress has limited the consumers' buying power and has imposed upon industry a peculiarly difficult problem in disposing of its products. Because of the difficulty in handling cost formulas on any term and "in view of the clearly established danger that they will be used to facilitate plans for uniform price fixing, we feel that a more effective way of stopping predatory price cutting would be to outlaw it in general terms and have an agency set up in the NRA to deal with specific cases promptly, thus gradually building up certain general rules which might be safely applied," the board stated.

Provisions in codes for output limitations, even if legal under the NRA, are held by the board to be contrary to that section of the Recovery Act which forbids monopolies. Where such remedies are needed, the board expresses the belief that they should be applied directly by the Administrator. It is claimed that the effect of leaving decisions for periodic determination of output and fixation of individual quotas to private interests or of limiting public action to consideration of plans submitted by them has been to encourage unwise restrictions of output and to allocate that output among producers upon unwise principles. In addition to recommending Administrator control, the board also says that insofar as measures of efficiency can be found, systems of allocation should give preference to the more efficient producers. Much the same considerations, it is stated, apply to numerous provisions in codes placing limitation upon the installation of new capacity.

"In the light of the great desirability of expanded activity in the capital goods industries, and in the light of the patent indisposition of members of an industry to welcome new competitors, we feel that, although unwise expansion of capital equipment should be discouraged, provisions controlling such expansion should be administered by a public agency," the report declared. "We believe that to give the code authority a large measure of control in deciding whether the installation of new capacity is to be permitted, as is the rule in the administration of provisions of this type, is to place an unreasonable temptation before the business interests involved."

In dealing with fixed price differentials between different classes of customers, the board recommends the handling of buying abuses by an administrative agency prepared to deal promptly and decisively with the complaints of price chiseling by very large buyers rather than by a general system of price differentials. It is held to be desirable to prevent large distributors from clubbing unreasonable discounts out of manufacturers, but very undesirable to freeze the present system of distribution by setting up arbitrary price differentials to apply to different stages of distribution.

Outright elimination of minimum price fixing from all codes is recommended. Originally the board had proceeded on the assumption that price fixing might well be explicitly authorized in the case of wasting natural resource industries. But the board now says experience has led it to believe that "price fixing is at its best an extremely dubious remedy for the admitted ills of a number of these industries and that if a decisive change in the conditions prevailing in the markets is required, a far more desirable method of procedure is to provide for allocation of production at the source, with safeguards such as those indicated previously, and to avoid the fixing of prices in the distributive process."

The board also recommended far greater emphasis on code provisions calling for informative labeling and said there also should be an attempt on the part of the administration to promote the development of quality standards for inclusion in codes.

Urging more advisers and higher pay, the board seeks additional funds for its work and recommends that a capable consumer interest be selected as a representative on each code authority.

Robins Acquires Mead-Morrison Co.

ROBINS Conveying Belt Co., of New York, has acquired the coal and ore handling business of the Mead-Morrison Manufacturing Co., of Boston, to be operated henceforth as the Mead-Morrison Division of Robins Conveying Belt Co.

The present consolidation gives to the Robins Co. a complete line of material handling machinery, including Mead-Morrison unloading towers, stocking and reclaiming bridges, pivoted bucket carriers, cableways, and car and barge hauling equipment, in addition to the Robins belt conveyors, crushers, screens, skip hoists and other units.

Many members of the Mead-Morrison staff have been taken into the Robins organization. Included in this number are Messrs. Brooks and Youngberg of Chicago, and Donahue, Snow and Brown of Boston.

The Mead-Morrison office at 220 East 42 Street, New York, has been closed. Its personnel has moved to the offices at 15 Park Row, New York.

At the Robins works in Passaic, New Jersey, a force of men is now installing equipment which is being transferred from the Mead-Morrison plant at East Boston, Mass.

Flanders Warns Conference Of Shorter Week Effects

WASHINGTON, March 6.—With President Roosevelt opening the code authority conference here yesterday, he urged shortening of hours and increased wages, as a means of increasing consuming power. This plan was offered as a challenge to industry, and with these importunities, the President served notice that the collective bargaining section of the Industrial Recovery Act must be observed by every corporation in the United States. Spokesmen for labor, together with Secretary of Labor Perkins, and Senator Wagner, also supported the idea of shorter working hours and increased wages. These two principles, again emphasized before industry, despite the heavy financial load already heaped upon it, were the keynote of the opening of the conference. The conference will continue throughout Thursday after which the NRA will review its work, and draft conclusions, which promise important revisions in codes as to labor, hours, pricing, trade practices and other fundamentals of most codes.

The President was the most loudly cheered speaker at the conference but a close second was Ralph E. Flanders, of the Jones & Lamson Machine Co., Springfield, Vt., and a member of the Industrial Advisory Board. Mr. Flanders took a position that did not accord with that of the President as to the matter of hours, for Mr. Flanders' message was in the nature of a warning. He declared that as a measure of spreading work during depression, shortening of hours has something to be said for it.

"As a measure of recovery," he said, "it is not merely ineffective—it is destructive."

In opening the conference, President Roosevelt reiterated what he said last June and told industry that its first task today, as it was then, is to create consuming power. He declared that with millions still unemployed the power of the people to purchase and use the products of industry is still greatly curtailed. It can be increased and sustained only by striving for the lowest schedule of prices on which higher wages and increasing employment can be maintained. As a challenge to industry, the President said it is its immediate task to reemploy more people at purchasing wage and to do it now. With increase in wages he also urged shortening of hours.

The President then turned his attention to the labor question and indicated that the government will, if necessary, enforce the labor sections of the Recovery Act.

Pointing out the period of administration has arrived, the President said that the law must be made certain and the letter and spirit must be fulfilled. He declared, "We cannot tolerate actions which are clearly monopolistic, which wink at unfair trade practices, which fail to give to labor free choice of their representatives or which are otherwise hostile to the public interest."

That the President considers as permanent the reorganization of a system of production and exchange, such as is provided by the NRA, was made clear.

Flanders Speaks for Industry

Ralph E. Flanders, speaking of the effect of still further shortening the working week cited six conclusions, as follows:

(1) As the President clearly brought out this morning, shorter hours without a rise in wage rates obviously is not a recovery but a relief measure in which the workmen previously employed relieve those who are reemployed under the new schedule. This would be a severe blow to those who are just beginning to get ahead with their old debts.

(2) If adjustments are made, the net results will vary with the proportional changes made in wage rates, prices and profits; but there will result a lowering of the industrial worker's income measured in goods he can buy, owing to diminished wages and/or higher costs and prices.

(3) The increased costs arising from shorter hours will of necessity require some price increases. There is no assurance that those price increases can be kept within the limits of absolute necessity. Most products pass through numerous hands before reaching the consumer. There are tens of thousands of products and hundreds of thousands of separate transactions on which new prices must be fixed. There is bound to be some pyramiding of costs. This will further increase the spread between agricultural and industrial prices thus defeating one objective of the recovery program.

(4) The lowering of wages and salary incomes and of profits and/or the increase in prices will choke the rising employment in industries furnishing luxuries, services, durable consumer goods and capital goods; since these are the depressed industries, the policy will seriously hinder recovery.

(5) While we are concerned with statistics as to persons employed a real recovery will be measured by the production on a larger scale of more goods, and a broader distribution and enjoyment of them; shorter hours limits production, distribution and enjoyment of goods and is thus a bar to recovery.

(6) The change from 48 or 50 or more hours per week to a standard 40-hour week is a serious drop which has not yet been assimilated. With not enough goods made even in 1929 to provide a desirable standard of living to the workers of the country, the raising of that standard under a 40-hour week will be difficult. With appreciably shorter hours it will be impossible.

Mr. Flanders said that shortening of hours in different industries can properly be done where a given industry meets a decrease in demand and wishes by that means to spread work throughout the industry. He stated that a particularly difficult situation exists in those industries in which recovery has not yet progressed to the point where employed workers can be worked at their maximum hours. Such industries were said to have a serious problem to solve as to how living wages shall be paid without price raises which will choke further recovery. No general solution, it was declared, can be offered; each case must be considered and solved as a separate problem. Mr. Flanders declared that it is difficult to see how a compensating rise in wages in an industry which shortens its hours for special reasons can have anything other than harmful effects on recovery on a small scale. He said it can only be hoped that the general improvement will be sufficient to counteract the effect of these relief measures.

Mr. Flanders suggested that "perhaps we have been too hasty in seeking to discard the C.W.A. and that it may need to be refined and put on a more sensible and satisfactory basis as a permanent institution."

Encourage Growth of Service Industries

Mr. Flanders declared that there is danger of forcibly reorganizing our economy into a subsistence basis. What must be done is quite the opposite, he pointed out. He said it is necessary to encourage the growth of service and luxury occupations "which our civilization can so richly afford. Our thought and planning should then go to better distributing these goods —not preventing their production."

In introducing Senator Wagner, National Recovery Administrator Hugh S. Johnson took occasion to deny published reports of discord between the National Labor Board and the NRA.

The address of Senator Wagner, chairman of the board, was mainly an appeal for business support of the bill he is sponsoring in Congress to make the board permanent and increase its powers for dealing with labor disputes.

Miss Perkins Adds Voice

Secretary of Labor Frances Perkins, supporting the position of the President, directed her remarks specifically to representatives of the durable goods industries when she told them that they must lend every effort to reabsorbing their proportionate share of those who are now unemployed.

... PERSONALS ...

EVERETT CHAPMAN, who joined Lukenweld, Inc., division of the Lukens Steel Co., Coatesville, Pa., early in 1930, as director of engineering and research, has been elected vice-president of Lukenweld, Inc. After graduation in 1924 from the University of Michigan with a master's degree in physics, Mr. Chapman taught electrical engineering at Purdue University, leaving to serve the Lincoln Electric Co., Cleveland, on experimental research and development.

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HAROLD W. FAINT, who has been in charge of special metallurgical and finishing problems in the plant of the Crowe Name Plate & Mfg. Co., Chicago, has joined the Chicago sales engineering staff of the Udylite Process Co., Detroit, Mich. Since his graduation from Rutgers University in 1917, he has been identified with the electroplating and metal finishing industry.

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KENNETH E. BURGESS, formerly technical director of Zapon Co., and more recently in charge of the lacquer division of Van Schaack Brothers Chemical Works, has been made a member of the technical staff of Ault & Wiborg Corpn., New York, which has taken over the lacquer division of the Van Schaack company.

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W. P. STARKEY, of Philadelphia, has been elected chairman of the board of the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., a newly created office. He has been a director of the company for the past 20 years, and at one time was general superintendent at the plant.

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DAVID ADAMS has been appointed Pittsburgh district sales manager of the Falk Corpn., Milwaukee, succeeding W. O. BEYER, who recently resigned to become a member of the Pittsburgh Civil Service Commission. Mr. Adams has been with the Falk Corpn. for the past four years in the sales department in Milwaukee and previously had been with National Malleable & Steel Castings Co., Sharon, Pa., and W. A. Riddell Co., Bucyrus, Ohio, in charge of foundry and sales. He was graduated from Rensselaer Polytechnic Institute, class of 1914.

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H. S. LANDON, manager of the Midwest office at Milwaukee for the International Graphite & Electrode Corpn., St. Marys, Pa., has resigned to become vice-president in charge of operations of the Pittsburgh Metallurgical Co., Niagara Falls, N. Y.

EVERETT CHAPMAN

W. J. HANNA, newly-appointed district sales manager at Chicago for Republic Steel Corpn., as reported in THE IRON AGE of Feb. 15, has been identified all his business life with the steel trade at Detroit and is well known throughout the automobile industry. He first represented the Trumbull Steel Co. there and later became associated with the Republic Iron & Steel Co. when it took over the Trumbull properties. When the present Republic Steel Corpn. was formed Mr. Hanna became assistant district sales manager at Detroit, a position which he held until his appointment to the district managership at Chicago.

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A. M. JONES has been appointed manager of the Midwest office, with headquarters at Milwaukee, of the International Graphite & Electrode Corpn., St. Marys, Pa.

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T. W. BURNS has resigned as works manager of the main plant of Fairbanks, Morse & Co., at Beloit, Wis., and on March 1 assumed new duties as a manufacturing executive of the A. O. Smith Corpn., Milwaukee, under WILLIAM C. HEATH, vice-president and general production manager, who formerly was general manager of the Beloit industry. Mr. Burns became identified with the Beloit plant in 1904 as a machinist apprentice, rising to works manager in 1926. During the World War he served nearly two years as assistant works manager of the United States Arsenal at Rock Island, Ill., on loan from his company.

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R. E. SAVELAND, associated with Fairbanks, Morse & Co., as an executive at the main works in Beloit, Wis., has been advanced to general superintendent of shops. He formerly was assistant to T. W. BURNS, works manager, who has resigned to join the A. O. Smith Corpn., Milwaukee. Appointment of GEORGE ZABEL as foundry superintendent of the Beloit works also has been announced by A. E. ASHCRAFT, general manager. HEINRICH SCHNEIDER has been appointed general chief engineer, and M. B. MACNEILLE, chief engineer of the hydraulic and Diesel division.

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C. RAYMOND MESSINGER, president, Chain Belt Co., and chairman of the board, Oliver Farm Equipment Co., Chicago, has been elected a director of the Chicago Corpn., an investment trust.

Pennsylvania Orders Freight Car Specialties

ANNOUNCEMENT is made by the Pennsylvania Railroad that orders for specialties used in freight car construction aggregating more than $1,000,000 have been placed with six metal products companies. The orders include metal ends, side doors, power hand-brakes and cast-steel car under-frames, all of which will be used in the railroad's extensive freight car construction project, a part of its general employment and improvement program financed by the Public Works Administration.

The new freight cars are being built in the railroad's shops at Pitcairn, near Pittsburgh, Altoona and Enola, near Harrisburg, and hundreds of railroad men are returning to regular employment on this work. The manufacture of materials for the cars is creating much additional employment in steel plants and other industries throughout the East and Middle West.

The firms which shared in the specialty orders announced today, made possible by Government cooperation with the railroad, are: Union Metal Products Co., Chicago; Camel Sales Co., Chicago; Youngstown Steel Door Co., Youngstown, Ohio; General Steel Castings Corpn., Eddystone, Pa.; Universal Draft Gear Attachment Co., Chicago; Equipment Specialties Co., Chicago.

Chicago Flexible Shaft Co. showed for 1933 a combined net profit of $189,515 after depreciation, Federal taxes and loss of $53,729 by foreign subsidiaries. This is equal to $1.05 a share on the $5 par value capital stock outstanding. In 1932 the company had a net profit of $22,759, after loss of $61,954 by foreign subsidiaries.

Union Labor Serves Ultimatum On Four Automobile Plants

DETROIT, March 6.

FOLLOWING a meeting at Lansing of 220 delegates representing 41 local automobile unions in Michigan affiliated with the American Federation of Labor, an ultimatum was ordered to be sent late Sunday to four motor car plants at Flint and Detroit. The ultimatum demanded (1) the right of workers to organize for collective bargaining, (2) reinstatement of all workers discriminated against because of union activities, and (3) elimination of the bonus system of payment.

The Buick Motor Co. and two plants of Fisher Body Corpn. at Flint have until Wednesday to reply to these demands, and the Hudson Motor Car Co. in Detroit until Thursday. The inference is that if these companies show no willingness to comply with the provisions in the ultimatum, federation officials will order their members to quit work. It is claimed that the Fisher Body and Hudson plants are 80 to 90 per cent unionized, while the federation membership at Buick includes a substantial majority of production men.

William A. Collins, representative at Detroit of the federation, has sent a telegram to President Roosevelt setting forth conditions in the industry considered objectionabe to employees. He refused to divulge its contents.

Only Works Councils Recognized

Explaining the demand in the ultimatum that workers be allowed to organize for collective bargaining, Mr. Collins declared that in all four plants the federation has in its ranks a large majority of the employees, yet the managements have refused to meet with committees from the local unions, recognizing only their own works councils set up and operated by them.

It is charged that manufacturers have carried on a consistent policy of sabotage against the unions and have discharged employees who had become union members or who showed union sympathies. Hourly wages have been increased in many cases, it is said, but through readjustment of the complicated bonus or group system of figuring rates, workers actually are being paid less than they formerly were.

Mr. Collins declares that employment and purchasing power have not increased as they should in view of the sharp rise in automobile production. This is due to the speeding up of individual operations in automobile factories and to the NRA ruling that the industry may average its maximum weekly work period of 40 hours over a year's time. In the rush season the industry may extend its work week to 48 hours for a limited time.

"I dread to think of what is going to happen," said Mr. Collins, "when the production peak is passed and the companies begin to lay off men to average up their 40-hour week." He added that this will come just about the time that the CWA activities are being liquidated and a terrific burden will be thrown on automobile manufacturing communities.

Charges Importation of Labor

In the face of the fact that about 128,000 people are unemployed today in Detroit (with the employment index of the local Board of Commerce standing at 99.1, the highest level since June, 1930), Mr. Collins charges that outside recruiting of labor is being carried on through advertising in the Southern press and through automobile agencies, explaining the reasons for this policy as being the desire of manufacturers to weed out men with union leanings and to have "lots of young, green, raw help." He declares that the industry wants no employees over 40 years of age.

Whether the American Federation of Labor will actually issue a strike call if its terms are not met by Buick, Fisher Body and Hudson is a matter of opinion. One observer thinks that the sending of the ultimatum is to attract attention in Washington at this time, when revisions of NRA are being considered. A rival labor organization takes the attitude that the federation is merely showing its members that it is doing something and that a strike is not contemplated.

Even if a strike eventuates, this organization believes that the federation will try to keep it from becoming general throughout the industry. This organization further hints that certain employers in Detroit have advised their men to join an A. F. of L. union if they join any, the assumption being that the federation's policy is conservative and the least disturbing to the present set-up.

Union Members Demand Action

There is slight doubt that the A. F. of L. is being rapidly maneuvered into a position of militancy by its membership in local automobile unions. It is believed here that high officials of the federation are sincere in their desire to avoid an open conflict at this time, but they necessarily must reckon with the mood of their members if they wish to consolidate and strengthen their position in the automobile industry.

The truth is that the federation has taken into its ranks in recent months thousands of members who expect a betterment in their condition. These members feel that if negotiations have led nowhere, the thing to do is to take drastic action in the form of refusal to work. Moreover, these members realize that now, with every company straining to get out as many cars as possible, is the time to strike, inasmuch as they have a much better chance of victory than they will when production starts to slump.

That the federation apparently hasn't a well-disciplined membership in its federal automobile union is shown by the unauthorized sporadic strikes which have broken out in various plants in this district in the last two to four weeks. These strikes have lasted from a few hours to two or three days each, and in at least one case a strike was called by union members during the absence of their local president. In these cases it is understood that officials of the A. F. of L. have used their influence to get the men to return to work.

Regional Boards Lack Authority

Undoubtedly the unwillingness of some manufacturers to deal with the National Labor Board has contributed to the impatience now shown by union members. Matthew Smith, member of the Detroit Regional Labor Board and general secretary of the Mechanics Educational Society, said in Washington the past week, "I was appalled at the lack of authority of the Regional Labor Board. When little employers are haled before it for violations, they at least make an appearance, but when General Motors or other big employers are concerned, they simply send no representative to the hearing. We make a decision in their absence. They proceed to ignore the decision and that is the end of it." When complaints are forwarded to Washington to the National Labor Board or Compliance Board, he said that "nothing happens."

This failure of orderly processes to correct what workers regard as attempts of automobile manufacturers to evade the spirit if not the letter of the law has greatly increased the demand for immediate action in the form of a strike, states a spokesman for the labor group. Recent localized strikes, most of which have resulted in some concessions to the employees, have added to the general restlessness.

There is good reason to believe that A. F. of L. officials, shrewdly judging the temper of the workers and foreseeing the likelihood of militant action, are ready to lead in such action rather than have a rival organization provide the leadership. Decision of the Mechanics Educational Society to establish a division for production workers and to compete with

the federation as the spokesman for all automobile workers lends credence to this belief.

The Mechanics Educational Society, organized about a year ago, has grown rapidly and now is laying down a formidable challenge to the A. F. of L. in the automobile industry proper and in tool shops around the country. It first was composed only of skilled tool and die makers and was responsible last fall for the calling of the tool and die strike in southern Michigan. For months it complained that the only spokesmen for labor on the Detroit Regional Labor Board were members of the American Federation of Labor. Finally it won its point for recognition of other union interests when Matthew Smith, its general secretary, was made a member of the board.

M.E.S. Organizing Production Workers

Organization of local unions of automobile production workers by the M.E.S. started about a week ago. A series of meetings was held on Sunday in Detroit. An official of the society states that no attempt will be made to disturb the local set-up in plants where the A. F. of L. has in its ranks an overwhelming majority of the workers. The M.E.S. considers that there are plenty of plants yet unorganized to which it can devote its efforts. Its officers also are so confident of success as a rival of the A. F. of L. that they believe that all they must do is wait long enough and local A. F. of L. unions will come over to the M.E.S. in a body. They base this contention on the fact that in companies in which they have local unions, employees are being paid much higher hourly rates than in plants where the A. F. of L. is dominant.

The Mechanics Educational Society claims a total membership of 70,000 of whom 17,000 are in Detroit, 2000 in Flint, 500 in Pontiac and the remainder in various cities outside Michigan. Its president, J. Chapman, is located in Toledo, having direct charge of the society's program there. The M.E.S. claims 80 per cent of the skilled operators in Toledo are members. Local unions have been started at Cleveland, Salem, Ohio, and Richmond, Ind.

Organizers of the M.E.S. are concentrating on establishment of local unions in the near future at Brooklyn, N. Y.; Warren, Ohio; Youngstown; Cincinnati and Lansing, Mich. At Brooklyn, operators in the tool and die trade are to be solicited for membership. At Cincinnati, the machine tool industry will be the center of attack.

A. F. of L. Has 41 Local Unions

As against the activities of the M.E.S., the American Federation of Labor has organized 41 local automobile unions in the State of Michigan and 39 outside of this State. It has never made a public statement regarding its total membership.

In case the A. F. of L. should call a strike, it is believed that the Mechanics Educational Society may not actively cooperate, but it will not put any obstacles in the path of the federation's program. Although both organizations speak about the activities of each other cautiously, the impartial observer can detect a feeling of hostility which cannot be entirely masked.

Motor Car Companies Pay High Rates

The larger automobile companies sincerely are of the opinion that they have leaned over backwards to be liberal in their dealings with labor. In plants where employee representation and works councils have been sympathetically administered, employees have obtained many tangible benefits. As already pointed out in THE IRON AGE, the automobile industry is paying wages today second only to the printing industry, based on hourly rates. General Motors has declared that its average rate is 60 per cent above the code minimum of 43c. an hour. In fact, only 1 per cent of its workers are being paid as low as the minimum.

W. S. Knudsen, executive secretary of General Motors Corpn., made the statement in Flint only a week ago that if the current production rate is maintained, workers will end 1934 with approximately the same total earnings for the year as in 1929.

To the charge of importation of labor, General Motors can point to its local employment stabilization policy which already has made Flint perhaps the most outstanding city in the country so far as rapid recovery is concerned. All of the employment rules and regulations in Flint in General Motors plants favor the permanent residents of the city.

February Ingot Output Averaged 42.78 Per Cent

THE monthly production of steel ingots for February, 1934, was 2,224,698 tons, according to the American Iron and Steel Institute. This represents a gain of 227,801 tons over January in spite of three more working days in that month.

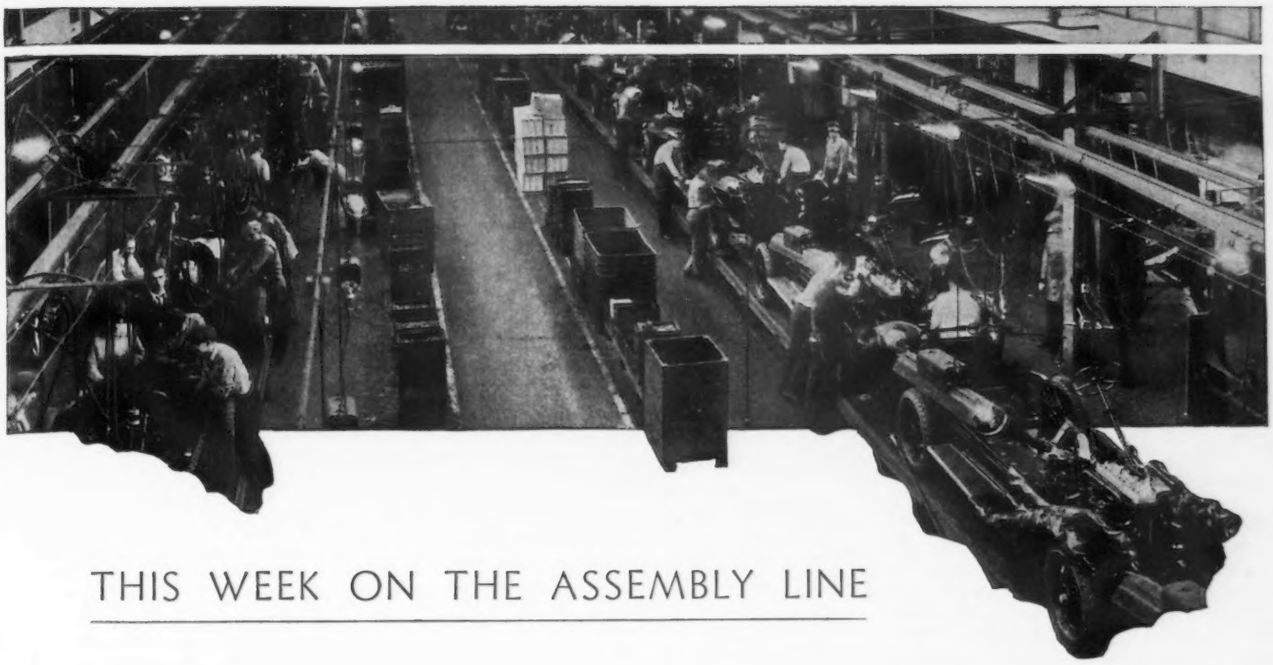
Approximate daily output of all companies was estimated at 92,696 tons. This is the highest daily rate since August, 1933. The average of operations for February at 42.78 per cent of total capacity was also highest since last August.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)
Reported for 1933 by Companies Which Made 98.10 Per Cent of 1932 Ingot Output

			Calculated Output All Companies		No. of Working Days	Per Cent Operation
1933	Open-Hearth	Bessemer	Monthly	Daily		
January	885,743	109,000	1,030,075	39,618	26	18.23
February	922,806	126,781	1,086,867	45,286	24	20.83
March	784,168	94,509	909,886	33,699	27	15.50
April	1,180,893	135,217	1,362,856	54,514	25	25.08
May	1,716,482	216,841	2,001,991	74,148	27	34.11
June	2,211,657	296,765	2,597,517	99,904	26	45.96
July	2,738,083	355,836	3,203,810	128,152	25	58.95
August	2,430,750	370,370	2,900,611	107,430	27	49.42
September	1,991,225	242,016	2,312,562	88,944	26	40.92
October	1,847,756	191,673	2,111,866	81,226	26	37.37
November	1,331,091	156,939	1,540,882	59,265	26	27.26
December	1,624,447	132,787	1,819,648	72,786	25	33.48
Twelve months	19,665,101	2,428,734	22,878,571	73,801	310	33.95
1934						
January	1,786,467	172,489	1,996,897	73,959	27	34.13
February	2,006,556	175,873	2,224,698	92,696	24	42.78

The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1932, of 67,386,130 gross tons for Bessemer and open-hearth steel ingots.

For the fiscal year ended Dec. 31, 1933, B. F. Goodrich Co. showed consolidated sales of $79,293,495 compared with $74,501,804 in 1932, the increase amounting to $4,791,691 or 6.43 per cent. Net profit for the year, after provision for depreciation, interest and Federal Income taxes and deduction of profit applicable to subsidiary companies' capital stock not owned by The B. F. Goodrich Company, amounted to $2,272,514 compared with a loss of $6,582,140 in 1932. The difference between cost and face value of the Company's bonds and debentures acquired during the year and credited to income amounted to $2,374,937 compared with $2,500,957 in the prior year.



THIS WEEK ON THE ASSEMBLY LINE

Labor Relations Cloud Automotive Horizon; Makers Short of Parts

DETROIT, March 6

ALTHOUGH the shortage of materials is of deep concern to automobile manufacturers just now, it is superseded by the labor situation as the chief source of anxiety. The industry feels that it is sitting on a keg of union powder which may explode at any minute. Sporadic outbreaks, taking the form of walkouts or the presentation by employees of demands for more pay and union recognition, have increased in number. Complete or partial victory on the part of the workers in many of these cases has added to rather than allayed unrest throughout this district.

Developments in Washington the past week have not helped matters. William Collins, Detroit head of the American Federation of Labor, laid down another barrage of general, sweeping charges of violation of the NRA against the automobile industry, similar to his attack launched a few weeks ago. The bill introduced in Congress by Senator Wagner threatens to outlaw present employee representation which is functioning efficiently through works councils in many automotive plants, including General Motors and Chrysler divisions.

The industry's major executives, therefore, are subordinating production and sales problems to labor relations, the study of which is absorbing almost all of their time. Admittedly a spark may touch off a general strike of production workers, disgruntled by the size of their weekly wages due to limitation of working hours under NRA and prodded on to action by professional agitators.

April Output May Be 400,000 Units

Aside from the labor storm clouds hovering on the horizon, the automotive outlook is favorable. Barring a general strike, assemblies this month should be at least 350,000 units, and April should rise above 400,000, the first time that that mark has been attained since May, 1930. The industry shouldn't be surprised if operations stayed at that level during May. With the relatively slow start in January and early February and with the assumption that most of the production runs of current models will be cleaned up in the first nine months of the year, there will have to be some big months ahead if assemblies in 1934 are to total 2,700,000 units, which is regarded in automotive circles as a very conservative figure.

Unless motor car operations are interrupted by serious labor difficulties, one can safely state that no month from March to September inclusive is likely to fall under 200,000 to 225,000 units, and at least two 400,000-car months are in prospect.

Ford Made 59,337 Units Last Month

Ford has announced that its domestic production in February amounted to 59,337 units, bringing its output for the first two months of this year to 116,912 units. Tentative schedules for March call for 83,000 cars and trucks.

Chevrolet made 72,273 units last month and is understood to have over 100,000 units projected for each of the next four months. Pontiac assembled 10,840 cars in February and has 18,000 planned for the current month, the biggest single month's volume since June, 1929. H. J. Klingler, president of the Pontiac company, is authority for the statement that total production for this year through May will be 78,300 units, as against 45,500 units in the same period of 1933. Pontiac has begun assemblies at Chevrolet's Oakland, Cal., and Atlanta plants to supplement its output at its home plant at Pontiac, Mich.

Plymouth Sets New High Mark

Plymouth has made notable gains the past two weeks, setting a new high mark for production each week. Its February assemblies are believed to have been about 36,000 cars. The Dodge division of Chrysler Corpn. is said to have turned out about 13,000 cars and trucks last month. Assemblies of De Soto and Chrysler Airflow cars are expanding; De Soto now has a backlog of 7500 orders.

The first 1934 La Salle came off the production line last week. Manufacture of this car will be stepped up by Cadillac as rapidly as possible to 600 a week. The factory has about 4000 orders for La Salles. Buick will continue at a pace of 10,000 cars a month. New sizes of steel for die tryouts for the small Buick have recently been delivered to Flint. It is reported that bodies for the new car will not be available from Fisher Body until about April 1. It is understood that the announcement date for this car

has not been set, although it probably will be in the latter part of April.

Olds Production Is Lagging

Oldsmobile is lagging far behind its original schedule. Work on the six is being accelerated, but less is known about the projected assemblies of Olds than of any other General Motors divisions. Because of its slowness in getting into production the Olds Six has not yet had an opportunity to offer a real sales challenge to the Dodge Six.

Hudson, imbued with a new spirit under the leadership of Roy Chapin, is counting on 18,000 units in March and a like number in April.

Parts Makers Pushed for Deliveries

Many motor car companies are resorting to every possible means to secure necessary parts to maintain production at the desired rate. Practically every experienced parts maker in this district is working two or three shifts a day and is being crowded for deliveries by automobile makers who want to make sure that the flow of materials to their assembly and sub-assembly lines is not stopped. Some parts manufacturers are not in a position to take further business for weeks ahead.

Steel releases by the automobile industry for April delivery have been in good volume, although in certain cases orders are being held back so as to reduce the amount of steel stocked and thereby make room for the storage of other materials and parts. That is, there is scarcely an automobile plant every nook and cranny of which is not filled with materials, and the problem of stocking parts and materials has become serious. Much steel which was stored out in the weather has recently been brought under cover and the space which it occupied allotted to other materials.

Outlook Favorable in Equipment Market

While equipment buying has been quiescent, the outlook is considered encouraging. It is believed that the larger car manufacturers have taken from their stocks of used machine tools most, if not all of the units which can be economically fitted into their current requirements. What remains is of obsolete design. Therefore future tooling programs will have to be built almost exclusively around the purchase of new equipment.

It is now believed that the new blooming, continuous strip sheet and cold-rolled mills bought by the Ford Motor Co. will not be ready to operate much before the end of 1934. Thus the amount of steel to be bought from outside mills for Ford production this year will not be affected by the expansion program at the Rouge plant.

Commercial Car Sales Increase

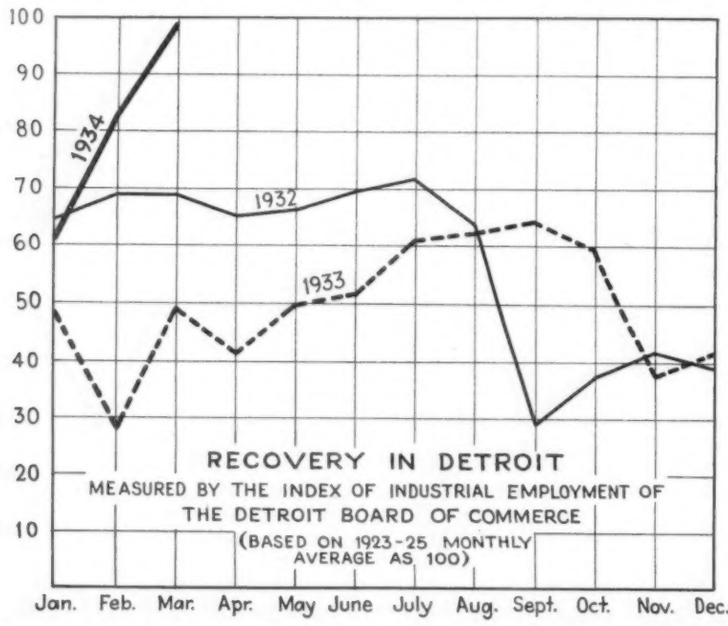
Improvement in the automobile industry this year is not confined to the passenger car field. Commercial car and truck sales in January were almost double those in the same month of 1933, and truck manufacturers are talking in terms of a total output in 1934 of at least 400,000 units. Ford intends to make a terrific fight to regain first place, which is now occupied by Chevrolet, and shortly will introduce a new line of commercial cars. Dodge has added to its plant capacity, while International Harvester is planning a vigorous sales campaign. Federal Truck has just entered the low-price market with a 1½-ton, six-cylinder model at $645. Reo is making a strong play for the light truck business; its truck production at present is three times that a year ago.

About two years ago Ford, Chevrolet and Dodge vied with each other to see which one could have the largest number of commercial car bodies as standard equipment. They discovered that in some cases they were selling certain bodies at lower than production costs. The result is that the number of standard models has been cut down substantially and independent body shops are getting much of the business which they lost when the leaders started out to become self-contained.

Detroit Notes

Pontiac states that it used 106,832 tons of steel and 22,572 tons of castings in 1933. Its 1934 requirements will be 169,260 tons of steel and 33,345 tons of castings. . . . Connecting rods and other forged parts for Chrysler divisions are being made by the Willys-Overland company at Toledo. . . . To care for increased shipments of automobiles on the Great Lakes, the Nicholson lines will operate eight large ships this year.

The Ford Motor Co. on Monday fired six open-hearth furnaces, raising its number of active furnaces to 10. Thus both Ford and Great Lakes Steel Corpn. are running at full capacity, giving Detroit the distinction of being the only steel producing center in the country operating at 100 per cent of ingot capacity. Expansion of the Ford ingot rate is attributed partly to apprehension lest its supply of steel be interrupted by development of labor difficulties at steel mills which are regular sources for Ford.



INDUSTRIAL EMPLOYMENT IN DETROIT

	1934	1933	1932
January	61.7	48.0	64.0
February	83.2	28.8	69.0
March	99.1	49.2	68.6
April	...	41.8	65.4
May	...	50.0	67.5
June	...	52.5	69.6
July	...	60.7	72.2
August	...	62.8	63.4
September	...	64.7	29.2
October	...	59.6	37.4
November	...	37.3	42.0
December	...	41.6	39.3

Based on first of month figure.

Steel Outlook Clouded Only by Ominous Labor Situation

Labor Disturbances in Automobile Industry Grow More Threatening—President's Plea Points to Higher Prices—Steel Output Higher

WITH automobile requirements undiminished and with can manufacturers engaging 75 per cent of the tin plate capacity of the country, the steel industry is getting added support from the railroads and miscellaneous consuming lines. Rail releases have raised output at Chicago, Birmingham and Pittsburgh. Unrelaxed pressure from the motor car trade has lifted operations to 100 per cent at Detroit, giving it the distinction of being the only steel producing center in the country operating at capacity. The Great Lakes plant in that district has been running full for some time and the firing of six open-hearths at the Rouge works on Monday put Ford on the same basis. Ingot output for the country at large has risen to 49 per cent, or two points above the level of a week ago.

The performance of scrap prices is in line with the trend of steel operations, and advances at Chicago and Philadelphia have lifted THE IRON AGE composite for heavy melting steel from $12.75 to $12.92 a gross ton.

WITH additional railroad releases in sight and with the prospect of larger awards of public works later on, the outlook is for further expansion of steel output unless labor difficulties grow more serious. The labor situation in the automotive industry has become increasingly ominous. The Nash strike is still unsettled, and immediate walkouts are feared at the Buick and Fisher Body plants at Flint and the Hudson works at Detroit.

Aside from the danger of industrial strife, the steel industry is much concerned about the President's demand for shorter hours and higher wages. Shortening working time has distinct practical limitations. The mill operatives themselves oppose reduction in their hours because it restricts their earning power. Moreover, a scarcity of skilled labor is already becoming apparent in certain departments and would be accentuated under the Administration's plan. Wage rates, of course, can be increased further but not without a compensatory rise in prices to the possible detriment of ultimate consumption.

THE steel industry abandoned advances for the second quarter in the hope that greater volume would offset higher costs. But if their costs are now to be given another boost, there will be no alternative but to ask more for their products.

Buyers have already sensed the change in the price outlook and are commencing to place contracts for the second quarter at the present market. At Cleveland a leading producer of pig iron has booked 6000 tons for the coming quarter. Meanwhile, except for the withdrawal of temporary reductions of hot strip steel, prices are unchanged, THE IRON AGE composite for finished steel remaining at 2.028c. a lb. and the pig iron composite at $16.90 a gross ton.

RAIL mills at Chicago have received allotments totaling 29,000 tons from the Chicago & North Western and the Chicago & Eastern Illinois. The Pittsburgh district mill is working on a Wheeling & Lake Erie release and expects soon to get rolling orders on 42,000 tons, representing its share of the Pennsylvania Railroad's order. The Ensley mill has booked 10,000 tons of rails from the Southern and 18,000 tons of rails and 2000 tons of fastenings from the St. Louis-San Francisco.

Pending orders include 10,000 tons of rails and 4100 tons of fastenings for the Wabash, 21,600 tons of rails and 6733 tons of fastenings for the Illinois Central, 42,121 tons of rails and 12,340 tons of accessories for the Erie and about 35,000 tons of rails for the Baltimore & Ohio. The New York Central has temporarily withdrawn its inquiry for 38,000 tons of rails in order to make revisions to comply with PWA requirements.

Orders for specialties for the Van Sweringen and Pennsylvania Railroad cars have been placed, and the release of the major steel requirements is expected to follow shortly. Mills in the East are now rolling some of the steel required for the Lehigh & New England cars, which were placed some time ago. The Delaware, Lackawanna & Western has issued inquiries for 25 locomotives and 500 steel hopper cars. The Wabash and Illinois Central have obtained loans for large equipment repair programs. The Baltimore & Ohio, the Reading and the Central of New Jersey are all purchasing steel for car repairs.

STRUCTURAL steel awards, at 21,800 tons, are the largest since the second week in January, while plate lettings total nearly 7000 tons. New structural projects, at 13,000 tons, compare with 7200 tons last week and 10,825 tons a fortnight ago. Severe weather has checked building operations, but the amount of tonnage in prospect is of encouraging proportions. Low prices still persist in the fabricating industry, which is not yet under a code.

Steel ingot production in February, in terms of daily rate, increased 25.3 per cent over January as compared with a gain of 15.1 per cent in pig iron output. February production of pig iron was 1,263,673 tons, or 45,131 tons a day, compared with 1,215,226 tons, or 39,201 tons daily, in January. Eighty-nine furnaces were in blast on March 1, a gain of two in the month, seven having been blown in and five put out or banked.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Mar. 6, 1934	Feb. 27, 1934	Feb. 6, 1934	Mar. 7, 1933
Per Gross Ton:				
No. 2 fdy., Philadelphia	$19.26	$19.26	$19.26	$13.34
No. 2, Valley furnace	17.50	17.50	17.50	14.50
No. 2 Southern, Cin'ti	18.13	18.13	18.13	13.82
No. 2, Birmingham†	13.50	13.50	13.50	11.00
No. 2 foundry, Chicago*	17.50	17.50	17.50	15.50
Basic, del'd eastern Pa.	18.76	18.76	18.76	13.50
Basic, Valley furnace	17.00	17.00	17.00	13.50
Valley Bessemer, del'd P'gh	19.76	19.76	19.76	16.89
Malleable, Chicago*	17.50	17.50	17.50	15.50
Malleable, Valley	17.50	17.50	17.50	14.50
L. S. charcoal, Chicago	23.54	23.54	23.54	23.17
Ferromanganese, seab'd carlots	85.00	85.00	85.00	68.00

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$40.00
Light rails, Pittsburgh	32.00	32.00	32.00	30.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh	31.00	31.00	31.00	31.00
Wire rods, Pittsburgh	36.00	36.00	36.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.75	1.75	1.75	1.60
Bars, Chicago	1.80	1.80	1.80	1.70
Bars, Cleveland	1.80	1.80	1.80	1.65
Bars, New York	2.08	2.08	2.08	1.95
Plates, Pittsburgh	1.70	1.70	1.70	1.60
Plates, Chicago	1.75	1.75	1.75	1.70
Plates, New York	1.98	1.98	1.98	1.648
Structural shapes, Pittsburgh	1.70	1.70	1.70	1.60
Structural shapes, Chicago	1.75	1.75	1.75	1.70
Structural shapes, New York	1.95¼	1.95¼	1.95¼	1.86775
Cold-finished bars, P'gh	2.10	2.10	2.10	1.70
Hot-rolled strips, P'gh	1.75	1.75	1.75	1.45
Cold-rolled strips, P'gh	2.40	2.40	2.40	1.80

Finished Steel

Per Lb.:	Mar. 6, 1934 Cents	Feb. 27, 1934 Cents	Feb. 6, 1934 Cents	Mar. 7, 1933 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.25	2.25	2.25	2.00
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.35	2.35	2.35	2.10
Sheets, galv., No. 24, P'gh	2.85	2.85	2.85	2.60
Sheets, galv., No. 24, Chicago dist. mill	2.95	2.95	2.95	2.70
Hot-rolled sheets, No. 10, P'gh	1.75	1.75	1.75	1.40
Hot-rolled sheets, No. 10, Chicago dist. mill	1.85	1.85	1.85	1.50
Wire nails, Pittsburgh	2.35	2.35	2.35	1.85
Wire nails, Chicago dist. mill	2.40	2.40	2.40	1.90
Plain wire, Pittsburgh	2.20	2.20	2.20	2.10
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.15
Barbed wire, galv., P'gh	2.85	2.85	2.85	2.35
Barbed wire, galv., Chicago dist. mill	2.90	2.90	2.90	2.40
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$4.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$14.75	$14.75	$13.25	$8.50
Heavy melting steel, Phila.	**12.00**	11.75	11.75	6.75
Heavy melting steel, Ch'go	**12.00**	11.75	10.75	5.25
Carwheels, Chicago	**12.25**	11.75	11.00	8.00
Carwheels, Philadelphia	12.75	12.75	12.75	8.00
No. 1 cast, Pittsburgh	**13.75**	13.25	12.25	9.00
No. 1 cast, Philadelphia	12.50	12.50	12.50	8.00
No. 1 cast, Ch'go (net ton)	9.50	9.50	9.50	6.25
No. 1 RR. wrot., Phila.	11.00	11.00	11.00	7.50
No. 1 RR. wrot., Ch'go (net)	9.50	9.50	9.25	4.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.50	$3.50	$3.50	$1.75
Foundry coke, prompt	4.25	4.25	4.25	2.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	7.75	7.75	7.75	4.75
Lake copper, New York	8.00	8.00	8.00	5.00
Tin (Straits), New York	**52.62½**	52.15	51.25	....
Zinc, East St. Louis	4.40	4.40	4.40	....
Zinc, New York	4.75	4.75	4.75	....
Lead, St. Louis	3.90	3.90	3.90	2.87½
Lead, New York	4.00	4.00	4.00	3.00
Antimony (Asiatic), N. Y.	**7.30**	7.20	7.15	5.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

▲ ▲ ▲

▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
March 6, 1934	2.028c. a Lb.	$16.90 a Gross Ton	$12.92 a Gross Ton
One week ago	2.028c.	16.90	12.75
One month ago	2.028c.	16.90	11.92
One year ago	1.923c.	13.56	6.83
	Based on steel bars, beams, tank plates, wire rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1933	2.036c., Oct. 3	1.867c., Apr. 18	$16.90, Dec. 5	$13.56, Jan. 3	$12.25, Aug. 8	$6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Pittsburgh Rate Up Two Points to 30 Per Cent

Resumption of Rail Mill Helps Local Production—Demand from Other Sources Shows No Further Expansion

PITTSBURGH, March 6.—The local steel industry has done little better than mark time during the past week. Recent active sources of demand have held their own, but scarcely any expansion in buying has been reported. Pressure for March delivery on sheets and strip steel for the automotive industry has been eased to some extent by the extension of current prices into the second quarter. While advances might still be made at any time, consumers would probably be given an opportunity to cover for the entire quarter at current levels. As a result, if shipments against recent orders are not completed by March 31, a new contract at the same price would be a mere formality.

Benefits from recent railroad orders are at last beginning to be felt in this district. The Pennsylvania has released tonnage against its car building requirements, and a small rail release from a nearby carrier has enabled the local mill to resume production for a short time. If the Pennsylvania specifies against its current order before the end of the week, rail mill activity would probably be continued through the month. Several Eastern carriers are preparing heavy car repair programs, and the Delaware, Lackawanna & Western is inquiring for 1000 hopper cars and 25 locomotives. The placing of rail orders by the New York Central, the Baltimore & Ohio and the Erie has been delayed, but seems certain to materialize in all three cases this month. Structural steel inquiry is heavier, but awards continue light. Shipments against active contracts on both reinforcing bars and structural steel have been at a virtual standstill in recent weeks because of weather conditions. Tubular goods and wire products are very quiet, and demand for bars shows no marked improvement.

Steel ingot production in the district has risen two points to 30 per cent of capacity, partly because of the increased requirements of the rail mill. Output in the Valleys is barely holding its own at 55 per cent, while Wheeling district production is well sustained at 80 per cent. Production of tin plate has risen to fully 75 per cent of capacity, with certain large producers running at even higher rates. Sheet and strip output is well sustained.

Pig Iron

Orders for foundry and malleable iron continue light, and shipments of the leading merchant producers in the district are a little more than 20 per cent of capacity. Bessemer and basic iron are particularly quiet, no substantial sales of the latter grade having been reported for many weeks. Ingot mold foundries in the Valleys are comparatively busy, and are taking a goodly portion of output of the two furnaces which supply them. A merchant stack in the Valleys which blew in recently is still active, although the Pittsburgh district producer still has its furnace banked because of the recent strong demand for coke.

Semi-Finished Steel

No change is reported in this market, with shipments of billets, slabs and sheet bars to non-integrated sheet, strip and tin mills still well sustained. No second quarter contracting has been reported, although sellers may now take business for this period at current prices. Higher quotations in the immediate future are not considered likely. Forging billets are fairly active, but wire rods continue very dull.

Rails and Track Accessories

The New York Central has withdrawn its inquiry for 40,000 tons of rails in order to make revisions to comply with the PWA requirements. This action was facilitated by decision of producers to extend the current price and contracting privileges on rails through March, although tonnage must be shipped by June 30, as heretofore. The New York Central is definitely expected to place its orders this month. The Erie Railroad's inquiry calls for 42,121 tons of rails, and 12,340 tons of track accessories. Action is also expected on this business during March. The requirements of the Baltimore & Ohio are less definite, but will probably amount to 35,000 tons. Rail purchases are reported in the West and South, but the local market is devoid of orders. Releases against tonnage on order are slow to come in, but a nearby road has issued shipping instructions on 4000 tons, which enabled the local rail mill to get into production. If the Pennsylvania begins to release before the end of the week, rolling will be continued indefinitely.

Bolts, Nuts and Rivets

With no price revisions announced to date, makers are expected to continue the current quotations of 70 per cent off list for bolts and nuts, 70 and 10 on small rivets, and $2.75 a 100 lb. on large rivets. Improved demand from both the automotive industry and the railroads is generally reported, with local markers benefiting particularly from the latter source. However, the requirements of car builders, who recently took large orders, have not been made known definitely.

Bars

Increased specifications for alloy steel and merchant bars are reported by some makers, but improvement can hardly be said to be general. Only scattered makers of automobiles and accessories are taking tonnage in a substantial way, with others apparently drawing on their stocks. Shipments to other large consuming industries are definitely limited, and the rate of expansion in demand is disappointing to many makers. Movement of reinforcing bars has subsided almost entirely in the last fortnight, but warmer weather would bring about a sharp increase in shipments. New contracting has also been light, although bids on road work are being taken in a number of states. Inquiry is disappointing, considering the large amount of material in prospect as a result of public works loans. No talk of price changes is heard.

Cold-Finished Steel Bars

As in the case of hot-rolled bars, demand is spotty, and some makers report little or no improvement in orders. Makers of agricultural equipment are placing scarcely any business, and manufacturers of textile machinery have been out of the market for several months. No price announcements for second quarter have been made, but mills are willing to take business at the current 2.10c., Pittsburgh, base.

Plates and Shapes

The structural steel market shows more life, with one large fabricator reporting new inquiry during the past week of more than 28,000 tons. While most of the projects involved are to be financed by PWA, an encouraging number of private projects are included. Structural awards, however, continue very light, and shipments against active contracts have been sharply curtailed because of inclement weather during the past month.

The plate market continues to show up better than that on shapes. While the car builders have not yet placed

the tonnage required for the freight cars recently ordered by the Van Sweringen roads, financial details are rapidly being completed, and the specialties involved in the purchases are reported to be allocated. Approval of the car builders' code will facilitate construction considerably. A number of Eastern roads are preparing extensive car repair programs for the early spring. The Delaware, Lackawanna & Western is also inquiring for 1000 hopper cars and 25 locomotives. Pittsburgh & West Virginia has purchased three freight locomotives. The Pennsylvania is releasing tonnage regularly against its recent purchases for freight car construction, and material is being rolled for this order. Barge building is inactive, but Government purchases of dredges, pontoons and other river and harbor equipment is stimulating the market. Boiler construction is languishing.

Tubular Goods

The pipe market is very quiet, and some makers report a decline rather than an improvement in recent orders. Extremely cold weather has adversely influenced demand for some types of standard pipe, although movement of oil country goods is holding its own. Reports of pending line pipe projects are apparently without foundation, as most of the inquiries before the trade call for from 2 to 10 miles of material. No developments are reported on the proposed purchase by Russia, which is being handled by the export association in New York.

Wire Products

Specifications against contracts for manufacturers' wire seem to be slightly heavier, and jobbers are placing a little business to round out stocks. However, distributers are too well supplied with inventories to promise sustained buying for some time to come. Demand from the agricultural districts is very light, and shipments of road mesh have been sharply curtailed by bad weather during the last month. Producers are willing to accept second quarter contracts at prevailing prices, and no immediate change is anticipated.

Sheets

Movement of sheet steel is holding its own, although many producers report no noticeable improvement during the last week. The requirements of the automobile industry are still heavy, but users no longer have a price incentive to force them to take out tonnage this month, and some of the pressure on mills has been eased. However, the code requires existing contracts to be fully shipped by March 31, and a new contract is required if delivery is extended into April. With no price changes this would be only a formality. All filings of a 2.65c., Pittsburgh, price on No. 24 gage, hot rolled, pickled in the breakdown, annealed, deoxidized sheets have now been withdrawn, and the market is now generally quoted at 2.75c., with No. 20 gage material priced at 2.65c. Sheet production continues to be well over 60 per cent of capacity, with many full finishing mills fully engaged. Galvanizing capacity is being utilized at about 40 per cent.

Tin Plate

Although specifications have not improved materially, mills have been advancing production gradually over the past two weeks, and production is now estimated at at least 75 per cent of capacity. The leading interest is engaged at 85 per cent, although some large independents are running at only 50 per cent. Current production is not all being shipped, although it is covered by actual specifications and anticipatory requirements.

Strip Steel

All makers of hot-rolled strip are now quoting 1.75c., Pittsburgh, and the Chicago differential of $2 a ton has again become generally effective. Mills are taking second quarter business at these levels, although customers are not being pressed to sign contracts. Demand from the automotive industry is well sustained, and many small manufacturing consumers are increasing their needs. However, with the price structure reestablished, and the possibility of immediately advanced quotations having been temporarily removed, much of the delivery pressure on mills has disappeared. Production is holding at about 60 per cent of capacity for the industry as a whole.

Coal and Coke

Domestic coke is still moving in heavy volume, but demand is letting up to some extent. A serious shortage of coke-carrying cars was barely averted by the change in weather. A local plant recently banked its blast furnace in order to meet heavy demand for heating coke. The foundry grade is slightly more active, with the requirements of railroad foundries particularly heavy. Prices are well sustained, with furnace coke quoted at $3.50 a ton, Connellsville, and the foundry grade at $4.25 a ton. The coal market has been slightly more active, but activity has not kept pace with that on coke.

Scrap

While no substantial sales of steel scrap have been reported during the last week in the Pittsburgh district, the market continues strong at recent levels. One consumer, in urgent need of first grade material, is reported to have paid $15.50 for a tonnage of railroad heavy melting, but this transaction was considered exceptional. In the meantime, a Valley mill paid $15 for No. 1 steel, $14.75 for hydraulic compressed sheets, and $14.25 for No. 2 heavy melting. However, the market in the Youngstown district is admittedly stronger than at Pittsburgh on some grades, particularly No. 2 steel. The highest price paid here for the latter material was probably $13.75. Machine shop turnings are stronger, with sales at $11.50 reported. Blast furnace scrap is also up 50c. a ton, and the cast grades are quotably higher. Extremely cold weather has prevented the movement of yard scrap in the last two weeks, resulting in a particularly strong market on any kind of scrap for urgent delivery. This situation is gradually correcting itself, but with the melt increasing at many points, scrap can hardly become plentiful for some time. This condition is expected to result in high prices for the current railroad offerings. The Pennsylvania list, closing on March 7, contains 21,400 tons, including 4000 tons of No. 1 heavy melting steel.

Business Sustained At Cincinnati

CINCINNATI, March 6.—Despite low melt and a continued feeling of uncertainty among foundry interests, orders for prompt shipment of pig iron expanded sharply, the past week, to a total of about 1200 tons. Books for second quarter have just been opened, but melters are interested only in current coverage. While code difficulties are still disturbing foundrymen, the possibility that labor trouble in the automotive field may cause cancellations of casting orders is adding to foundry problems.

Coke

Revision of coke freight rates, effective March 15, has disturbed the district market noticeably. Coke interests are refusing commitments beyond March 15 while attempting to revise delivered prices to district points. Definite announcement of schedules, however, is being withheld until the entire situation yields to present analysis.

Steel

Although automotive demands for sheets has leveled out, steady expansion of business from other sources is sustaining the present buoyant market. Books for first quarter are filled and contracts for delivery through the second quarter are being taken. Jobbing interests are restocking and manufacturing demand generally is good. Rolling schedules for this week are set between 60 and 70 per cent.

Scrap

The Valleys are drawing on the scrap supply here, thereby tending to offset the extreme lethargy of the local market. Bid schedules have advanced 50c. The Chesapeake & Ohio is offering a list of about 12,000 tons.

Production Soars to 51 Per Cent at Chicago

Release of Rail Tonnage Boosts Operations—President's Address Throws New Light on Price Outlook—Scrap Advances

CHICAGO, March 6.—Ingot output has gained sharply to 51 per cent of capacity, a rise of over six points in a week. While miscellaneous business is somewhat better, much of the credit for the week's advancement must be laid at the door of rail mills, whose increased schedules have resulted in the addition of a steel works blast furnace. Books for second quarter have now been opened for almost a week, and it is evident that buyers are still inclined to be cautious and will limit purchases to close estimates of actual needs.

Up until yesterday users were disposed to consider the price structure stable, but the plea of the President for higher wages and shorter working hours throws a different light on the situation, inasmuch as most steel men contend that higher wages mean higher prices for steel.

It is interesting to note that the proportion of rails now moving is well ahead of accessory shipments, thus reversing the recent relationship. Mills look for a broadening of the track supply market, particularly in view of the fact that eight or nine of the major railroads have not yet been heard from in the matter of rails, which must carry with them proportionate tonnages of supplies.

Shipments of steel to automobile centers, excepting Wisconsin, where strikes still prevail, are growing and activity among farm implement manufacturers is now spreading to the tractor division.

Pig Iron

Forward buying is assuming fair proportions and already it seems certain that books for the second quarter will be substantially heavier than those for the first quarter. Southern iron is slowly gaining in favor because of the price differential. Producers of pig iron are eying suggestions from Washington as to higher wages and shorter working hours, these being factors in future price policies. Certain divisions of the malleable industry are in a flurry because it is found that under code sanction prices have been raised to the point where bronze castings are being substituted for the malleable iron product.

Cast Iron Pipe

Although business is better than in March a year ago, it is nevertheless very light for this time of year. Private work is non-existent and municipal inquiries are scarce. There is much complaint that pipe bought for CWA work is not being paid for. Chicago is releasing 1900 tons, bids for which were taken several months ago.

Reinforcing Bars

Public works inquiries are again turning up, but so far the volume is not in keeping with what dealers had expected by the early part of March. The Sanitary District, Chicago, opened bids March 1 on sewer project No. 8, which calls for 530 tons. Cook County, Ill., and the State of Illinois are taking bids on 1000 tons.

Cold-Finished Bars

Second-quarter books have been opened at 2.15c. a lb., Chicago. Buyers' minds, eased by the fact that prices are unchanged for future delivery, are taking their time in making commitments for the coming quarter. Demand to the east of here is heavy, but users' needs in Chicago are light.

Wire Products

There is no rush to make commitments, as books have been opened for the second quarter at unchanged prices. Shipments to all classes of users are showing healthy growth, but the market is being held back by a lack of real interest in most rural areas. Sellers are looking forward hopefully to the last half of March, which they believe will mark a sharp upturn in demand from farmers. Railroad business remains spotty and small, but movement to automobile centers continues to climb and has not reached its peak according to observations made at Detroit. Orders from miscellaneous users remain small. For the first time in many months output of wire and wire products, at about 40 per cent of capacity, is behind production of heavy finished steel products, which has climbed to 50 per cent of capacity.

Rails and Track Supplies

Final allotment of rails by the Chicago & North Western gave 19,000 tons to Illinois Steel Co. and 6,000 tons to Inland Steel Co. The Chicago & Eastern Illinois has placed 3200 tons with Illinois and 800 tons with Inland.

Sheets

This market can be characterized only as fair for the reason that 65 per cent of the tonnage moving is going to automobile plants. The furniture trade is dull and roofing shops have not hit their spring stride. Books are open for second quarter at unchanged prices.

Plates

Word is being passed around that the steel for the Van Sweringen cars, about 170,000 tons in all, will be allotted in the next few days. The trade looks for additional tonnages from the Illinois Central car repair program and also for cars for the Milwaukee. Work in railroad shops is spotty and has not expanded.

Bars

Farm implement manufacturers continue to step up output, especially in tractor departments. There is a steady flow of bars to automobile plants with the exception of the Nash plants, which remain closed on account of strikes. Miscellaneous consumption is not making much headway and individual orders are usually small.

Structural Material

Awards are confined to a few scattered bridge jobs, but inquiries, including several projects that are being revived, total over 10,000 tons. There remains a considerable tonnage of steel yet to be ordered from mills for CWA work, and Illinois is carrying over bids taken last November. Fabricators have no idea when these tonnages will break, but they count on many of them reaching shops in the early spring. All money available for projects on the Mississippi River has been allotted and additional appropriations are needed to carry on the work. At many points along the river awards have been made for locks and more money must be forthcoming for dams at these same points.

Scrap

Upward of 40,000 tons of heavy melting steel has recently been taken by consumers at prices as high as $12.25 a gross ton delivered. This is an advance of 25c. a ton, which follows by one week a rise of $1 a ton. These higher prices have loosened supplies, but the better grades of scrap are far from abundant and brokers continue to reach out into outlying territory in their attempts to cover orders. In fact, this covering game has become somewhat of a scramble and top prices prevail on broker trades. The scrap industry believes that the peak of mill operations will be reached in the early part of April and they are gaging their market moves accordingly.

Steel Bookings Somewhat Lighter at New York

Severe Weather Retards Trade—New Export Bank to Release Russian Business—Japan Buys Tin Plate Wasters

NEW YORK, March 6. — Steel bookings remain at a satisfactory level, with tin plate specifications in particularly good volume. The award of a couple of hundred tons of stainless steel for Navy work is also a feature. However, total business volume is somewhat below that of recent weeks. The recession is attributed to recent severe weather, which tied up the movement of material to consuming plants and prevented salesmen from calling on their trade.

Formal approval of the Nickel Plate's purchase of 20 locomotives has resulted in the release of wheel and axle orders, but the award of plates and other steel requirements will be held up a week or two longer pending the completion of detailed specifications. The Erie is definitely in the market for 42,121 tons of rails and 12,340 tons of fastenings. In general, railroad tonnage is still largely prospective, being unusually slow in reaching the mills.

McClintic-Marshall Corpn. has been awarded the fabrication of the midtown post office, New York, calling for 12,300 tons. Mason & Hanger Co., Inc., New York, which has the general contract on the midtown tunnel, New York, has received revised figures on the steel, totaling about 9000 tons. With these two exceptions, this district is devoid of large construction projects.

Pending inquiries from Soviet Russia for pipe, sheets and other products are expected to result in orders soon, since the new Government export bank will start operations this week. Exporters find difficulty in satisfying current Japanese demand for tin plate wasters, which embraces all sizes and gages. While it is reported that the material is wanted for the manufacture of toys and novelties, the heavy gages would hardly be suitable for that type of fabrication.

The recent reduction of $1 a ton to 1.70c. a lb., Pittsburgh, on hot-rolled strip has been withdrawn, leaving the market at its previous level. All other prices have been reaffirmed for the second quarter.

Pig Iron

First quarter quotations have been extended for second quarter delivery, and consumers are consequently not inclined to anticipate their forward needs. Bookings during the past seven-day period aggregated 1300 tons, as compared with 1400 tons in the preceding week, and 1700 tons sold two weeks ago. There is practically no inquiry, and daily purchases merely reflect the prompt requirements of melters. The general industrial improvement has not yet materially influenced foundry melt in this territory, and furnaces do not expect an active interest in iron until foundry backlogs are more encouraging.

Reinforcing Steel

Awards to distributers in this district were particularly heavy during the past week. About 1700 tons of bars was placed for two projects at Washington, and State highway and bridge work in New York accounted for 800 tons. American Steel & Wire Co. will furnish 350 tons of mesh for the New York Midtown post office, and about 300 tons of bars is yet to be awarded. Sellers are anticipating early purchases of about 2000 tons of bars for the midtown, New York, tunnel and the Camden approach to the Delaware River bridge at Philadelphia.

Scrap

Pennsylvania mills are increasingly in need of heavy melting steel as production rates advance, but they are not yet ordering material as freely as Mid-Western melters. Brokers in this buying district continue to accumulate shipments for export, and, in addition, are stocking some material in anticipation of the heavy domestic demands expected in the near future. Shoveling, turnings, and No. 1 blast furnace advanced to $4 a ton as one broker covered the commitments of a Buffalo furnace, and No. 1 and No. 2 heavy melting steels each strengthened 50c. a ton, on barge, for shipment to Japanese and Italian melters. No 1 machinery cast is now 25c. higher at $7.50 a ton, and unprepared iron and steel is being purchased at $5.50 on the strength of the better prices offered for heavy melting grades. Although brokers are actively fulfilling old export contracts, new commitments are not as plentiful because of a general disinclination to meet the higher quotations now prevailing. Several lots have been sold to England, and Poland is buying in moderate quantities, but new business with Japan and Italy is currently in poor volume.

St. Louis Road to Buy 10,000 Tons of Rails

ST. LOUIS, March 6.—Receivers of the Wabash Railway will purchase 10,000 tons of rails and accessories, to cost $564,706, from a loan of $1,481,000 from the PWA. The rails will be laid in Missouri, Illinois and Indiana.

It is estimated that 10,000 tons of plates will be required for the 67,895 lineal feet of 48, 54 and 60-in. electric welded steel pipe for the pressure conduit, on which the St. Louis Board of Public Service will take bids March 16.

It is understood here that the general contractors for the Kansas City municipal auditorium will award the 4700 tons of structural steel required to the Kansas City Structural Steel Co.

Otherwise new business in structural steel is light. Wire products are dull. The movement out of warehouses which stocked up before the price advance has been insufficient to warrant further purchases now. Hot-rolled strips dropped from 1.85c., Chicago, to 1.80c., and then jumped back to the first named price, with no appreciable increase in demand, as a result of the reduction. Sheet business is strong, with delivery the all-important factor in sales.

In antipication of a price rise on March 1 which failed to materialize, several thousand tons of pig iron were sold in this market last week. Buying subsided when the expected advance was not put into effect. The melt in the district continues to improve.

The Tulsa (Okla.) Rolling Mills Co. has started its open-hearth furnace, which has been down for several years.

The scrap market continues strong, with No. 1 heavy melting steel, No. 2 railroad wrought and cast iron car wheels 25c. a ton higher; No. 1 railroad cast 50c. up and railroad malleable $1 higher. Dealers are shipping some scrap to the Chicago and Ohio valley markets, where higher prices are being paid. The Nashville, Chattanooga & St. Louis has a list of approximately 30 carloads.

Steel Output in Further Rise at Cleveland

Ingot Rate Up Two Points to 69 Per Cent —Sheets and Strips Ordered for April Shipment—Scrap Advances

CLEVELAND, March 6.—Some sheet and strip tonnage for April shipment has been placed by the automotive industry and a further increase in activity in these products for delivery next month is looked for within the next week or two. Mills have opened their books for the second quarter at present prices for all products, but consumers as yet have shown no interest in making contracts for the quarter. However, the automotive manufacturers did not delay long after March 1 to get some tonnage on the mill books, as they wished to avoid an interruption in the flow of steel after shipments against first quarter specifications are finished by March 31.

Specifications for sheets and strip for March delivery have subsided, as consumers generally got their orders on the mill books before the end of February and mills are so well filled that little additional tonnage in cold-rolled sheets or cold-rolled strip is available for shipment before the end of March.

Ingot output in the Cleveland-Lorain territory increased two points this week to 69 per cent of capacity. In the two local active steel plants there is now only one open-hearth furnace that is not operating.

The Van Sweringen railroads during the week made large allocations of specialties for their 12,725 freight cars and with these about disposed of there probably will be little further delay in the signing of contracts for the cars and the placing of the car steel.

Considerable activity has developed in pig iron since the opening of books for the coming quarter at current prices. Many consumers evidently wish to protect themselves against a possible price advance during the quarter.

New scrap purchases have been made by Cleveland and Valley mills, and local prices have advanced sharply.

Pig Iron

Considerable activity has developed in foundry and malleable iron since the opening of books at the present $17.50 price for the second quarter. A leading producer sold 6000 tons during the week, mostly for the coming quarter. The possibility of an advance during the quarter because of increasing production costs evidently is stimulating the placing of contracts covering the quarter. Shipments have increased this month, and a gain of 25 to 30 per cent is expected over February. The demand is largely from the automotive industry. Malleable foundries are operating well. Some substantial business in both malleable and steel casting has been allocated to Central Western foundries for freight cars for the Van Sweringen Railroads.

Sheets

Some tonnage has been placed for April shipment by consumers who are anxious to get their orders on the mill books for the first rolling schedules in the coming month. Mills have opened their books for the quarter at present prices, but no quarterly contracts are reported. However, some of the larger automobile companies are expected to place round tonnages for the quarter shortly. Specifications have slumped following the influx of large automotive orders for March shipment, which will keep most of the mills engaged at near capacity through the month. Demand from the refrigerator and steel barrel industries and sign manufacturers is good, and orders from the stove industry have improved.

Strip Steel

Mills have opened their books for the second quarter at the present prices of 1.75c., Pittsburgh, for hot-rolled strip and 2.40c., Cleveland, for cold-rolled material, but little interest has been shown as yet in contracts. Specifications, in the case of some of the mills, have fallen off following the placing of large tonnages by the automotive industry for shipment prior to April 1. Mills are being crowded for deliveries. Some producers have orders for about all the cold-rolled strip they can produce before the end of the current quarter.

Bars, Plates and Shapes

Merchant bars continue in good demand. While most of the tonnage is coming from the automotive industry, consumers in other fields are ordering freely. There is little activity in structural shapes and plates. New public construction work calls for only small lots of shapes and reinforcing bars. Alloy steel bar prices have been reaffirmed for the second quarter. A Firestone service station in Cleveland will require 220 tons of reinforcing bars.

Wire Products

Mills have opened their books for the second quarter at present prices. New demand is slow. Jobbers are reducing their stocks in order to have these at a minimum on June 30, when shipments on consignment will be eliminated.

Scrap

Prices have advanced sharply on practically all grades. A Cleveland mill late last week bought 10,000 tons of No. 1 heavy melting steel at around $13.25 and is expected to close this week for blast furnace scrap. A Valley district mill purchased a substantial tonnage, paying $15 for No. 1 heavy melting steel and $14.75 for hydraulic bundles. Advances in dealers' prices range from 25c. on machine shop turnings and blast furnace grades to $1 a ton or more on heavy melting steel and bundles.

Warehouse Business Gains on Coast

SAN FRANCISCO, March 5.—A sharp gain in warehouse business during the week is attributed to improvement in general industrial activity. Jobbing business has shown a definite strengthening during the last two months, with some houses reporting a doubling of the volume of the corresponding period last year. A greater movement of sheets is to be noted, although reinforcing bar and structural steel demand has fallen off. Pig iron has shown a seasonal increase in production. Prices remain unchanged with the exception of the warehouse price on reinforcing bars on which the mill base is now quoted.

United States Steel Products Co. was awarded contracts for Government radio towers at Pearl Harbor, T.H., and Summit, C.Z., in which approximately 3500 tons of structural steel will be required. At San Francisco, the Moore Dry Dock Co. took 125 tons of structural steel for caisson work on the Trans-Bay bridge, while Golden Gate Iron Works was awarded 100 tons for trusses for the Forest Service. The Bureau of Reclamation awarded Chicago Bridge & Iron Co. 430 tons of structural steel and 900 tons of plates for a bridge and siphons on the Owyhee project in Oregon. It is reported that Sheffield Steel Co. booked 3000 tons of reinforcing bars at Denver, Colo., for delivery at Boulder dam. Lettings during the week aggregated 4418 tons of structural steel, 1103 tons of reinforcing bars and 1150 tons of plates. New inquiries were limited to 1108 tons of structural steel and 1126 tons of cast iron pipe.

Finished Steel Orders Lagging at Philadelphia

Miscellaneous Railroad Buying Constitutes Principal Activity — Large Inquiries for Piling—Scrap Stronger

PHILADELPHIA, March 6.—Demand for finished steel products reported by mills in this district has been frankly disappointing during the last week. Following a period of increased activity, prompted largely by releases from the Pennsylvania Railroad, demand from other sources has failed to increase in line with expectations. Tonnage reflects no definite decline, but the return of mild weather, along with promised railroad tonnage, should have brought continued expansion in business during the first week of March. Operations are holding up and have even been advanced one point to 30 per cent of capacity, but the output of the smaller independent companies shows no change.

The steel releases of the Pennsylvania Railroad have benefited practically all the mills in the district, but individual allotments were not large and shipments are to be extended over a period of 15 weeks. Only freight car building steel is included with orders for rails and track accessories still held up. The Baltimore & Ohio, the Reading and the Central of New Jersey are beginning to place small orders for car repair programs which promise to expand before the end of the month.

Pig Iron

While shipments are expanding slightly, large orders are lacking and the market is still rather quiet. Foundries have not increased their melt perceptibly, although their stocks of iron are being depleted and some buying is expected before the end of the quarter.

Plates, Shapes and Bars

The outlook for structural steel seems to be definitely better. New inquiry is more encouraging, the outstanding project being a Government airport at Middletown, Pa., which will require 3500 tons. The New Jersey section of the Philadelphia-Camden bridge subway will probably come out for bids this week, with 1800 tons of structural steel, 1700 tons of reinforcing bars and 2700 tons of sheet steel piling involved. An additional 1300 tons of piling will be required for bulkheads at Cape May, N. J., on which bids will be taken next week. The American Bridge Co. has taken 480 tons of structural steel for five Pennsylvania Railroad bridges at Camden, N. J.

Plate business is confined almost entirely to railroad requirements. Mills have begun making deliveries to the Pennsylvania for its car building program and car builders have placed their requirements for 500 freight cars for the Lehigh & New England. A little plate tonnage for car repairs is being ordered. Bars are very quiet, with movement of reinforcing steel hampered by bad weather.

Sheets

Automobile body plants in the district have made no additional purchases and miscellaneous demand does not bulk very large. Radio makers are inactive, although some business is coming from manufacturers of stoves and other kitchen equipment. The Sparrows Point, Md., tin mill is engaged at near capacity.

Imports

The following iron and steel imports were received here last week: 952 tons of pig iron from British India, 400 tons of ferromanganese from Norway and 100 tons of the same product from Poland, and 42 tons of steel tubes, 16 tons of steel bars, 11 tons of steel rods, 9 tons of steel forgings and 1 ton of steel billets from Sweden.

Scrap

This market has failed to reflect the activity reported in other districts. Mills are showing no interest in their requirements, and, at the present low rate of operations, seem to have adequate supplies. No. 1 heavy melting steel is no longer available at less than $12, although direct purchases at this level cannot be confirmed. Sale of a comparatively large tonnage of a special grade of steel at a slightly higher price has not affected the local market. No. 2 steel is stronger and stove plate is active at $9.50.

Further Rise in Buffalo Output

BUFFALO, March 6. — Bethlehem Steel Corpn. has again expanded operations at its Lackawanna plant, placing its thirteenth open-hearth on the active list. Rail orders have had no part in building up this output. Republic Steel Corpn. is operating five furnaces and Wickwire-Spencer Steel Corpn one. One of the active Republic furnaces is the 100-ton unit, which replaces one of the five 50-ton furnaces operated the previous week. The Seneca sheet division of Bethlehem continues to operate at 80 per cent of capacity.

Bethlehem Steel Corpn. has placed a second stack in blast at Lackawanna. The pig iron market is quiet as second quarter contracting opens at unchanged prices. Large lots are not being placed, and foundry melt throughout the State appears to be spotty.

Scrap is the strongest it has been in years. Dealers in many instances are paying more than they are receiving for scrap. With prices strong and getting stronger, with low stockpiles in consumers' yards and material hard to pick up, the situation is full of possibilities. It is virtually certain that the next sale of No. 1 heavy melting steel will be at least $13. One of the principal consumers has less than 30,000 tons of scrap on hand, and is now using hot iron in its mixture in place of scrap. Sales of No. 1 machinery cast at $13 are reported; sales of low phosphorus scrap at $14, Lockport, are noted. Stove plate is very firm, with dealers paying as high as $10.50 to fill orders. Severe weather has hampered yard operation and delayed incoming shipments.

Boston Scrap Prices Are Firmer

BOSTON, March 6. — Scrap prices generally are firmer, yet in some instances are not in line with those at other points. To illustrate, based on the Pittsburgh market No. 1 heavy melting steel should be $8.30 to $8.80 on cars, Boston, but no sales have been made at more than $8.25 to $8.50. A Worcester, Mass., consumer has paid $10 a ton, delivered, which figures out at less than the delivered Pittsburgh market. A fair price on steel turnings is $5 a ton on cars, but not all brokers can pay that much, although at least one sale has been made at $5.25. Worcester will not meet the Pittsburgh steel turnings price, so the market has become a strictly Pennsylvania proposition. New England foundries are taking stove plate at around $7 a ton, de-

livered at consumer's yard. No. 2 steel prices have been stepped up to $6.50 to $6.75 on cars. Movement of scrap has improved somewhat, but many yards and sidings are still clogged with snow and ice.

Pig iron sales are mostly in carlots, and the aggregate is rather small. Machinery makers note a further decrease in their bookings, and the lack of Government work is felt among other melters.

Alabama Mill Books Rails

BIRMINGHAM, March 6.—Last week was one of the best since Jan. 1, from the standpoint of new steel tonnage. There was a moderate pickup in practically all lines of products.

Books were opened last Thursday for the second quarter, with all first quarter prices carried forward unchanged.

Additional rail tonnage has been booked and continued operation of the rail mill is now assured for some weeks. The Southern Railway has bought 10,000 tons, for delivery during the next 90 days. Seaboard Air Line has secured authority from the Federal court for rail purchases and is expected to place some tonnage in the district.

Last week started with 12 openhearths active and on Thursday the number was increased to 13. The additional unit was added at the Ensley works of the Tennessee company. The same number will operate this week, with four at Fairfield, six at Ensley and three at Alabama City.

Pig Iron

Local furnaces opened their books for second quarter pig iron on March 1. No change was made in the base price of $13.50, which has been in force since Aug. 25. A few small orders for second quarter iron have been received, but the time has been too short since books were opened to develop any definite movement.

Foundry requirements are still being filled largely from stocks on hand. There are day-to-day bookings, mostly of small size and for prompt delivery. February shipments were slightly ahead of January and the prospects for March are said to be somewhat better.

The furnace situation has not changed since Jan. 27. Ten furnaces are in blast, three being on basic iron, five on foundry, one on recarburizing and one on ferromanganese.

Pipe

Pressure pipe makers are looking forward to an improvement in March. Inquiries have picked up and more lettings are scheduled for this month than in February. Two Birmingham plants expect to provide about 4600 tons of 6000 tons required by San Juan, Porto Rico. Quotations continue at $36 to $37.

Cast Iron Pipe

Lowell, N. C., plans water pipe line system. Fund of $47,000 has been secured through Federal aid, including elevated steel tank and tower, and fire hydrants.

Wartrace, Tenn., plans about 10 miles of 10-in., and 4 miles of 2 to 8-in. for water system. Fund of $152,000 is being arranged, including reservoir, chlorinating plant, etc. C. N. Harrub Engineering Co., American Trust Building, Nashville, Tenn., is engineer.

Gretna, La., will take bids soon for pipe for extensions in municipal water system, including elevated steel tank and tower, and pumping machinery. Swanson-McGraw, Inc., Balter Building, New Orleans, is engineer.

Goshen, Ind., plans quantity of 4 to 12-in. for water line. Also 500,000-gal. elevated steel tank and tower, pumping machinery and auxiliaries. Charles Brossman, Chamber of Commerce Building, Indianapolis, is consulting engineer.

Chicago, has awarded 1500 tons of 12 to 16-in. to Glamorgan Pipe & Foundry Co., and 400 tons of 16 to 48-in. to Bessemer Foundry & Machine Co.

Wheaton, Minn., plans pipe line for water supply. Fund of $25,000 is being arranged, including pumping plant. Rose & Harris, 430 Oak Grove Street, Minneapolis, is engineer.

Southwest City, Mo., plans water pipe line. Fund of $42,000 is being arranged, including pumping station, etc. A. C. Moore, Joplin, Mo., engineer.

Copeland, Kan., plans pipe line for water supply. Fund of $25,000 has been secured through Federal aid for this and water station. Charles W. Suite, Garden City, Kan., is engineer.

Los Angeles County Board of Supervisors, Los Angeles, plans 6-in. in Oxford Avenue, Altadena, Cal.

Oakland, Cal., has awarded 650 tons of 16-in. to United States Cast Iron Pipe Co.

Brementon, Wash., has taken bids on 2400 ft. of 8 and 10-in.

Lovell, Wyo., will vote on improvements to a water system which will include 720 tons of 4 to 10-in.

Beverly Hills, Cal., will take bids March 27 on 120 tons of 8 and 12-in.

Oakland Cal., will take bids March 14 on 120 tons of 4-in.

How Much Have Steel Wage Costs Increased?

OFFICIAL figures covering the wage costs of the iron and steel industry in June and November, 1933, indicate an increase of 69 per cent per ton as shown below.

Although these statistics are undoubtedly correct, steel companies themselves believe that they give a distorted picture of what actually occurred. It will be noted that man-hours per ton increased from 27.6 in June to 38.8 in November. Such a sharp rise can be explained only on the assumption that a much larger proportion of highly finished materials was produced in November than in June. It is also possible that there may have been some decrease in efficiency due to the desire of steel companies to spread employment as much as possible.

Steel companies contend that no fair comparison of wage costs per ton of finished product can be made unless the kinds of material produced are taken into consideration. Without going into such a detailed study, they estimate that the per ton increase in labor cost from raw materials to finished steel products in the period from June to November, 1933, was approximately 20 per cent, not including purchased materials.

	TONNAGE Fin. Steel	HOURS	MAN HR./TON	HOURLY EARNING	COST/TON
June	1,870,000	51,645,000	27.6	47.3c.	$13
November	1,110,000	43,044,000	38.8	57.7c.	$22
Total Increase			11.2	10.4c.	$9

Railroad Equipment

South African Railways & Harbors, Johannesburg, South Africa, is inquiring for 50 locomotives.

Delaware, Lackawanna & Western is in the market for 20 steam and five oil-electric locomotives and 500 steel hopper cars.

The Pennsylvania has ordered 250 sets of car trucks from National Malleable & Steel Castings Co.

Receivers of Wabash Railway announce at St. Louis they have obtained a loan of $1,481,000 from the PWA, of which $564,706 will be used to purchase 10,000 tons of rails to be laid in Missouri, Illinois and Indiana, and $916,000 in rebuilding and repairing rolling stock and air-conditioning passenger equipment. Work will begin late this month and will require employment of 240 additional men in shops at Decatur, Ill.

New York, Ontario & Western plans purchase of about 1750 tons of track material, rail fastenings, etc., and 4725 tons of rails. Financing for $235,000 has been authorized for program.

Northern Pacific will build railroad from Odair, Wash., to site of Grand Coulee dam, Columbia River, about 29 miles, for hauling machinery and materials for dam construction.

RAILS

St. Louis-San Francisco has placed an order with the Tennessee Coal, Iron & Railroad Co. for 18,000 tons of rails and 2000 tons of fastenings.

Southern Railway has ordered 10,000 tons of rails from the Tennessee Coal, Iron & Railroad Co.

Wabash is in the market for 10,000 tons of rails and 4100 tons of fastenings.

Chicago & North Western has placed 19,000 tons of rails with Illinois Steel Co., and 6000 tons with Inland Steel Co.

Chicago & Eastern Illinois has ordered 3200 tons of rails from Illinois Steel Co., and 800 tons from Inland Steel Co.

Illinois Central is in the market for 21,600 tons of rails and 6733 tons of fastenings.

Erie is in the market for 42,121 tons of rails and 12,340 tons of track accessories.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel Base per Lb.
F.o.b. Pittsburgh mill	1.75c.
F.o.b. Chicago or Gary	1.80c.
Del'd Philadelphia	2.04c.
Del'd New York	2.08c.
F.o.b. Cleveland	1.80c.
Del'd Detroit	1.90c.
F.o.b. Buffalo	1.85c.
F.o.b. Birmingham	1.90c.
F.o.b. cars dock Pacific ports	2.30c.
F.o.b. cars dock Gulf ports	2.15c.

Rail Steel
(For merchant trade)

F.o.b. Cleveland	1.70c.
F.o.b. Chicago	1.70c.
F.o.b. Gary	1.70c.
F.o.b. Pittsburgh	1.65c.
F.o.b. Buffalo	1.75c.
F.o.b. Birmingham	1.80c.

Billet Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. P'gh mills	1.90c.
F.o.b. Birmingham	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Cleveland	1.95c.
Del'd Detroit	2.05c.
F.o.b. Youngstown	1.95c.
F.o.b. cars dock Pacific ports	2.35c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. Chicago	1.95c.

Rail Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. Pittsburgh	1.75c.
F.o.b. Cleveland	1.80c.
F.o.b. Chicago	1.86c.

Iron

Common iron, f.o.b. Terre Haute, Ind.	1.60c. to 1.75c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.89c.
Common iron del'd New York	1.93c.

Steel Car Axles

F.o.b. Pittsburgh	2.50c.
F.o.b. Chicago	2.50c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Birmingham	1.85c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.885c.
F.o.b. Coatesville	1.80c.
F.o.b. Sparrows Point	1.80c.
Del'd New York	1.96c.
F.o.b. dock cars Pacific ports	2.25c.
F.o.b. cars dock, Gulf ports	2.10c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Floor Plates

F.o.b. Pittsburgh	3.20c.
F.o.b. Chicago	3.25c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.
F.o.b. Buffalo	1.80c.
F.o.b. Bethlehem	1.80c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.965c.
Del'd New York	1.952c.
F.o.b. cars dock, Gulf ports	2.10c.
F.o.b. dock cars Pacific ports (standard)	2.25c.
F.o.b. dock cars Pacific ports (wide flange)	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.00c.
F.o.b. Chicago mill	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base..2.45c. a lb. except at Bethlehem where the price is 2.55c. Delivered price at Detroit is 2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars*

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.15c.
Bars, Cleveland	2.15c.
Bars, Buffalo	2.20c.
Bars, Detroit	2.30c.
Bars, eastern Michigan	2.35c.
Shafting, ground, f.o.b. mill, 1½ in.	3.40c.
1-3/16 to 1½ in.	2.90c.
1-9/16 to 1⅞ in.	2.75c.
1-15/16 to 2⅜ in.	2.60c.
2-15/16 to 6 in.	2.45c.

* In quantities of 10,000 to 19,000 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.75c.
No. 10, f.o.b. Gary	1.85c.
No. 10, del'd Detroit	1.95c.
No. 10, del'd Phila.	2.04c.
No. 10, f.o.b. Birmingham	1.90c.
No. 10, f.o.b. dock cars Pacific ports	2.42½c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.25c.
No. 24, f.o.b. Gary	2.35c.
No. 24, del'd Detroit	2.45c.
No. 24, del'd Phila.	2.54c.
No. 24, f.o.b. Birmingham	2.40c.
No. 24, f.o.b. dock cars Pacific ports	2.95c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.30c.
No. 10 gage, f.o.b. Gary	2.40c.
No. 10 gage, del'd Detroit	2.50c.
No. 10 gage, del'd Phila.	2.59c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.00c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.75c.
No. 20 gage, f.o.b. Gary	2.85c.
No. 20 gage, del'd Detroit	2.95c.
No. 20 gage, del'd Phila.	3.04c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.45c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Gary	2.95c.
No. 24, del'd Phila.	3.14c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, f.o.b. dock cars Pacific ports	3.55c.
No. 24 Wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.25c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.65c.
No. 28, Gary	2.75c.

Tin Plate

Base per Box

Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.75c.
All widths up to 24 in., Chicago	1.85c.
All widths up to 24 in., del'd Detroit	1.95c.
Cooperage stock, Pittsburgh	1.85c.
Cooperage stock, Chicago	1.95c.

Cold-Rolled Strips

F.o.b. Pittsburgh	2.40c.
F.o.b. Cleveland	2.40c.
Del'd Chicago	2.68c.
F.o.b. Worcester	2.60c.

Fender Stock

No. 20, Pittsburgh or Cleveland	3.10c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of $2 a ton is made to jobbers on straight, mixed or joint carloads; $3 a ton is allowed on less-than-carload shipments.

	Base per Keg
Standard wire nails	$2.35
Smooth coated nails	2.35
Galvanized nails:	
15 gage and coarser	4.35
16 gage and finer	4.85
	Base per 100 Lb.
Smooth annealed wire	$2.35
Smooth galvanized wire	2.70
Polished staples	3.05
Galvanized staples	3.30
Barbed wire, galvanized	2.85
Woven wire fence, base column	60.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Wrought Iron Inches	Wrought Iron Black	Wrought Iron Galv.
⅛	51½	29½	⅛	+91½	+138
¼ to ⅜	57	38½	¼ & ⅜	+11½	+21½
½	62	50½	½	31½	15
¾	65½	53½	¾	36½	20½
1 to 3	67½	58½	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	63½	54½	2	37	22½
2½ to 3	66½	57½	2½ to 3½	38	25
3½ to 6	68½	59½	4 to 8	40	28½
7 and 8	67½	57½	9 to 12	38	24½
9 and 10	67	57			
11 and 12	66	56			

Butt Weld, extra strong, plain ends

⅛	48½	33½	⅛	+13	+45½
¼ to ⅜	54½	41½	¼ & ⅜	+2½	+34½
½	60	51	½	32½	17½
¾	64½	55½	¾	37½	22½
1 to 3	66½	58½	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	61½	53½	2	40	26
2½ to 3	65½	57½	2½ to 4	45½	33
3½ to 6	69	61	4½ to 6	45	32½
7 and 8	68	58	7 & 8	46	33
9 and 10	67	57	9 to 12	41½	30
11 and 12	66	56			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	33	1½ in.—1¾ in.	44
2½ in.—2¾ in.	40	2 in.—2¼ in.	13
3 in.	44	2½ in.—2¾ in.	16
3¼ in.—3½ in.	47	3 in.	17
4 in.	49	3¼ in. to 3½ in.	18
4½ in. to 6 in.	42	4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five. Exception: On 1¼ to 1¾-in. charcoal iron tubes no supplementary discounts are granted, and the discount for 10,000 lb. to a carload is 4 points under base and for less than 10,000 lb. 8 points under base.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn

1 in.	68	3 in.	38
1¼ to 1½ in.	68	3½ to 3½ in.	41
1¾ in.	68	4 in.	43
2 to 2¼ in.	27	4½, 5 and 6 in.	36
2½ to 2¾ in.	34		

Hot-Rolled

2 and 2¼ in.	33	3¼ to 3½ in.	47
2½ and 2¾ in.	40	4 in.	49
3 in.	44	4½, 5 and 6 in.	42

In the case of all sizes except 1-in. to 1¾-in. cold-drawn boiler tubes supplementary discounts of two 5 per cents are allowed on carload lots. On quantities up to 10,000 lb. the base discount is reduced 10 points and a supplementary discount of 5 per cent only is allowed. On quantities 10,000 lb. to 24,999 lb. the base discount is reduced 6 points and a supplementary discount of 5 per cent only is allowed. On 25,000 lb. to a carload the base discount is reduced 2 points and supplementary discounts of two 5 per cents are allowed.

On 1 to 1¾-in. cold-drawn boiler tubes, there are no supplementary discounts. On quantities up to 10,000 lb. the base discount is reduced 12 points; on 10,000 lb. to 24,999 lb., it is reduced 8 points; on 25,000 lb. to a carload it is reduced 2 points.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 3.30% to 40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, 60-lb. and heavier, per gross ton	$36.37½
Angle bars, per 100 lb	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$32.00
Light rails (from rail steel) per gross ton	31.00

Base per 100 Lb.

Spikes, 9/16 in. and larger	$2.40
Spikes, ½ in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Track bolts, to steam railroads	3.55
Track bolts, to jobbers, all sizes (per 100 count)	70 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	70, 25 and 10
Stove bolts in packages, Ch'go.	70, 25 and 10
Stove bolts in packages, Cleveland,	70, 25 and 10
Stove bolts in bulk, P'gh	80
Stove bolts in bulk, Chicago	80
Stove bolts in bulk, Cleveland	80
Tire bolts	60

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago and Birmingham	2.85

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago and Birm'g'm	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 180 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screw, 1 in. dia. and smaller	75, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ⅜ in. and smaller	75
Upset hex. head cap screw, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	80
Upset set screws cut and oval point	75 and 10
Milled studs	65 and 5

STAINLESS STEEL

(18% Cr. 8% Ni. 0.08 to 0.12% C)
(Base Prices, f.o.b. Pittsburgh)

	Per Lb.
Bars	23c.
Plates	26c.
Sheets	33c.
Hot-rolled strip	20c.
Cold-rolled strip	27c.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Youngstown, Chicago, Gary, Buffalo, Cleveland, Birmingham.

	Per Gross Ton
Rerolling	$26.00
Forging quality	31.00

Delivered Detroit

Rerolling	$29.00
Forging quality	34.00

Sheet Bars

F.o.b. Pittsburgh, Youngstown, Cleveland, Chicago, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open-hearth or Bessemer	$26.00

Skelp

F.o.b. Pittsburgh, Youngstown, Chicago, Buffalo, Coatesville, Pa., or Sparrows Point, Md.

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$36.00
Cleveland	36.00
Chicago	37.00
Birmingham	39.00
Youngstown (del'd)	37.00

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem.
Base price, $49 a gross ton except at Bethlehem, where it is $51.
Price del'd Detroit is $52.

CARBON STEEL FORGING INGOTS

F.o.b. Pittsburgh, Youngstown or Chicago.
Uncropped, $28 per gross ton.

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.50
Foundry, f.o.b. Connellsville Prompt	$4.25 to 5.25
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	10.50
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland delivered	9.27
Foundry, Birmingham	4.75
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.55 to $1.80
Mine run coking coal f.o.b. W. Pa.	1.80 to 2.00
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.30
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.20
Steam slack, f.o.b. W. Pa. mines	1.30 to 1.40
Gas slack, f.o.b. W. Pa. mines	1.65 to 1.85

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.73c.
No. 5 industrial fuel oil	3.00c.
Per Gal f.o.b. Cleveland	
No. 3 distillate	5.75c.
No. 4 industrial	5.50c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works: High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	43.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	46.00	40.00
Ground fire clay, per ton	7.00	

Chrome Brick

	Per Net Ton
Standard size	$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	55.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$44.00 to $45.00
4-in., del'd Chicago	47.00 to 48.00
6-in. and larger, del'd New York	43.00
4-in., del'd New York	46.00
6-in., and larger, Birmingham,	36.00 to 37.00
4-in. Birmingham	39.00 to 40.00

Class "A" and gas pipe, $3 extra.

Pig Iron, Ores, Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$18.50	$19.00	$18.00	$19.50
Bethelehem, Pa.	18.50	19.00	18.00	19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	....	18.00	....
Neville Island, Pa.	18.00	18.00	17.00	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown	17.50	17.50	17.00	18.00
Buffalo	17.50	18.00	16.50	18.50
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, Ohio	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
Hamilton, Ohio	17.50	17.50	17.00	18.00
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	....
Duluth, Minn.	18.00	18.00	....	18.50
Birmingham	13.50	....	12.50	....
Provo, Utah	16.50	....	....	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass	$19.00	$19.50	$18.50	$20.00
From Buffalo	19.00	19.50	18.50	20.00
Brooklyn				
From East. Pa. or Buffalo	20.77	21.27	20.27	21.77
Newark or Jersey City, N. J.				
From East. Pa. or Buffalo	19.89	20.39	19.39	20.89
Philadelphia				
From Eastern Pa.	19.26	19.76	18.76	20.26
Cincinnati				
From Hamilton, Ohio	18.51	18.51	18.01	19.01
Canton, Ohio				
From Cleveland and Youngstown	18.76	18.76	....	....
Columbus, Ohio				
From Hamilton, Ohio	19.50	19.50	....	....
Mansfield, Ohio				
From Cleveland and Toledo	19.26	19.26	....	....
Indianapolis				
From Hamilton, Ohio	19.77	19.77	....	....
South Bend, Ind.				
From Chicago	19.55	19.55	....	....
Milwaukee				
From Chicago	18.50	18.50	....	....
St. Paul				
From Duluth	19.44	....	....	....
Davenport, Iowa				
From Chicago	19.26	19.26	....	....
Kansas City				
From Granite City	20.04	20.54	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N.Y. $23.00
Johnson City, Tenn. 23.00
Del'd Chicago 28.65

GRAY FORGE PIG IRON

Valley furnace $17.50

CHARCOAL PIG IRON

Lake Superior furnace $20.50
Delivered Chicago 23.54
Delivered Buffalo 23.78

CANADA
Pig Iron

Per gross ton:

	Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00

	Delivered Montreal
No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard, (carload)	$85.00
Domestic, 80%, seaboard, (ton lots)	92.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$27.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$22.25	12%	$29.25
7%	23.25	13%	30.75
8%	24.25	14%	32.25
9%	25.25	15%	33.75
10%	26.25	16%	35.25
11%	27.75	17%	36.75

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$27.25	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads	$1.25 to $1.25
Ferrotungsten, less carloads	1.30 to 1.35
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V	$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace, carload and contract per net ton	$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorous, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorous, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	24c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48%	20c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid, delivered*	$15.00
Tungsten, domestic scheelite, delivered	$14.50 to $15.00

	Per Gross Ton
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines	$16.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2¼% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	13.25 to 13.75
No. 2 railroad wrought	14.50 to 15.00
Scrap rails	14.50 to 15.00
Rails 3 ft. and under	15.50 to 16.00
Sheet bar crops, ordinary	15.00 to 15.50
Compressed sheet steel	14.25 to 14.75
Hand bundled sheet steel	12.50 to 13.00
Hvy. steel axle turnings	13.00 to 13.50
Machine shop turnings	11.00 to 11.50
Short shov. steel turnings	11.00 to 11.50
Short mixed borings and turnings	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Cast iron carwheels	13.00 to 13.50
Heavy breakable cast	12.50 to 13.00
No. 1 cast	13.50 to 14.00
Railr. knuckles and couplers	16.00 to 16.50
Rail, coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phos. billet crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	15.50 to 16.00
Low phos. punchings	16.00 to 16.50
Steel car axles	17.00 to 17.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$11.75 to $12.25
Shoveling steel	11.75 to 12.25
Hydraulic comp. sheets	$10.50 to $11.00
Drop forge flashings	9.50 to 10.00
No. 1 busheling	10.50 to 11.00
Rolled carwheels	12.50 to 13.00
Railroad tires	12.50 to 13.00
Railroad leaf springs	12.50 to 13.00
Axle turnings	9.50 to 10.00
Steel couplers and knuckles	12.50 to 13.00
Coil springs	12.50 to 13.00
Axle turnings (elec. fur.)	10.00 to 10.50
Low phos. punchings	12.50 to 13.00
Low phos. plates, 12 in. and under	12.50 to 13.00
Cast iron borings	7.50 to 8.00
Short shoveling turnings	7.50 to 8.00
Machine shop turnings	7.00 to 7.50
Rerolling rails	12.50 to 13.00
Steel rails, less than 3 ft.	12.75 to 13.25
Steel rails, less than 2 ft.	13.25 to 13.75
Angle bars, steel	12.50 to 13.00
Cast iron carwheels	12.25 to 12.75
Railroad malleable	12.50 to 13.00
Agricultural malleable	10.50 to 11.00

Per Net Ton

Iron car axles	$12.25 to $12.75
Steel car axles	12.00 to 12.50
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	10.50 to 11.00

No. 2 busheling	$4.50	to	$5.00
Locomotive tires, smooth	10.50	to	11.00
Pipe and flues	5.50	to	6.00
No. 1 machinery cast	9.50	to	10.00
Clean automobile cast	9.00	to	9.50
No. 1 railroad cast	9.00	to	9.50
No. 1 agricultural cast	8.50	to	9.00
Stove plate	7.50	to	8.00
Grate bars	6.50	to	7.00
Brake shoes	8.50	to	9.00

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel			$12.00
No. 2 heavy melting steel			9.50
No. 1 railroad wrought			11.00
Bundled sheets			9.50
Hydraulic compressed, new			10.00
Hydraulic compressed, old	7.00	to	7.50
Machine shop turnings			7.50
Heavy axle turnings	10.00	to	10.50
Cast borings	5.50	to	6.00
Heavy breakable cast	11.50	to	12.00
Stove plate (steel works)			9.50
No. 1 low phos. heavy	15.00	to	15.50
Couplers and knuckles	14.50	to	15.00
Rolled steel wheels	14.50	to	15.00
No. 1 blast furnace	5.50	to	6.00
Spec. iron and steel pipe			10.00
Shafting			16.50
Steel axles			14.50
No. 1 forge fire			11.00
Cast iron car wheels	12.50	to	13.00
No. 1 cast	12.00	to	13.00
Cast borings (chem.)	12.00	to	14.00
Steel rails for rolling			13.00

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$12.50	to	$12.75
No. 2 heavy melting steel	12.00	to	12.50
Compressed sheet steel	11.50	to	12.00
Light bundled sheet stampings	8.50	to	9.00
Drop forge flashings	11.50	to	12.00
Machine shop turnings	9.00	to	9.50
Short shoveling turnings	9.50	to	10.00
No. 1 busheling	11.50	to	12.00
Steel axle turnings	10.00	to	10.50
Low phos. billet crops	14.50	to	15.00
Cast iron borings	8.75	to	9.25
Mixed borings and short turnings	9.00	to	9.50
No. 2 busheling	9.00	to	9.50
No. 1 cast	11.00	to	11.50
Railroad grate bars	7.50	to	8.00
Stove plate	7.00	to	7.50
Rails under 3 ft.	15.00	to	15.50
Rails for rolling	17.00	to	17.50
Railroad malleable	12.00	to	12.50
Cast iron carwheels			12.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$11.75	to	$12.25
No. 2 heavy melting steel	10.25	to	10.75
Scrap rails	11.50	to	12.00
New hydraul. comp. sheets	10.25	to	10.75
Old hydraul. comp. sheets	9.25	to	9.75
Drop forge flashings	10.25	to	10.75
No. 1 busheling	10.25	to	10.75
Hvy. steel axle turnings	9.50	to	10.00
Machine shop turnings	7.00	to	7.50
Knuckles and couplers	13.50	to	14.00
Coil and leaf springs	13.50	to	14.00
Rolled steel wheels	13.50	to	14.00
Low phos. billet crops	14.00	to	14.50
Short shov. steel turnings	8.00	to	8.50
Short mixed borings and turnings	8.00	to	8.50
Cast iron borings	8.00	to	8.50
No. 2 busheling	7.50	to	8.00
Steel car axles	13.00	to	13.50
Iron axles	13.00	to	13.50
No. 1 machinery cast	12.50	to	13.00
No. 1 cupola cast	11.50	to	12.00
Stove plate	10.25	to	10.75
Steel rails, 3 ft. and under	13.00	to	14.00
Cast iron carwheels	12.00	to	12.50
Industrial malleable	12.00	to	12.50
Railroad malleable	12.50	to	13.50
Chemical borings	10.00	to	11.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel			$10.00
Scrap steel rails			9.00
Short shoveling turnings			5.50
Stove plates	$7.00	to	7.50
Steel axles	10.50	to	11.00
Iron axles	10.50	to	11.00
No. 1 railroad wrought			7.00
Rails for rolling			10.50
No. 1 cast	9.00	to	9.50
Tramcar wheels	9.00	to	9.50
Cast iron borings, chem.			8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$10.50	to	$11.00
No. 1 heavy melting	9.50	to	10.00
No. 2 heavy melting	9.50	to	10.00
No. 1 locomotive tires	9.00	to	9.50
Misc. stand.-sec. rails	12.00	to	12.50
Railroad springs	11.50	to	12.00
Bundled sheets	6.00	to	6.50
No. 2 railroad wrought	9.25	to	9.75
No. 1 busheling	6.50	to	7.00
Cast iron borings and shoveling turnings	5.25	to	5.75
Rails for rolling	12.00	to	12.50
Machine shop turnings	5.25	to	5.75
Heavy turnings	6.00	to	6.50
Steel car axles	11.25	to	11.75
Iron car axles	12.50	to	13.00
Wrot iron bars and trans.	9.75	to	10.25
No. 1 railroad wrought	6.75	to	7.25
Steel rails less than 3 ft.	12.50	to	13.00
Steel angle bars	11.50	to	12.00
Cast iron carwheels	9.25	to	9.75
No. 1 machinery cast	9.00	to	9.50
Railroad malleable	10.00	to	10.50
No. 1 railroad cast	9.50	to	10.00
Stove plate	6.50	to	7.00
Relay rails, 60 lb. and under	16.00	to	16.50
Relay, rails, 60 lb. and over	$20.00	to	$21.00
Agricult. malleable	9.00	to	9.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$8.25	to	$8.50
Scrap T rails	8.25	to	8.50
No. 2 steel	6.50	to	6.75
Breakable cast	7.00	to	7.25
Machine shop turnings	5.00	to	5.25
Bundled skeleton, long	6.00	to	6.50
Forge flashings	6.00	to	6.50
Blast furnace scrap	2.75	to	3.00
Shafting	11.00	to	11.25
Steel car axles	10.50	to	11.00
Wrought pipe	5.00	to	5.25
Cast iron borings, chemical	8.50	to	9.00

Per gross ton delivered consumers' yards:

Textile cast	$10.00	to	$10.50
No. 1 machinery cast	10.00	to	10.25
Stove plate	7.00	to	7.25
Railroad malleable	11.00	to	11.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$8.00	to	$9.50
No. 2 heavy melting steel	7.00	to	8.00
Heavy breakable cast	7.50	to	8.00
No. 1 machinery cast	8.00	to	8.50
No. 2 cast	6.75	to	7.50
Stove plate			6.00
Steel car axles	10.50	to	10.75
No. 1 railroad wrought	7.50	to	8.00
No. 1 yard wrought, long	$6.50	to	$7.00
Spec. iron and steel pipe	5.75	to	6.00
Forge fire	5.50	to	6.00
Rails for rerolling	9.00	to	9.25
Short shoveling turnings	3.00	to	4.00
Machine shop turnings	3.50	to	4.00
Cast borings	4.50	to	4.75
No. 1 blast furnace	2.50	to	4.00
Cast borings (chemical)	11.00	to	11.50
Unprepared yard iron and steel	5.00	to	5.50

Per gross ton, delivered local foundries:

No. 1 machinery cast			$11.00
No. 1 hvy. cast (cupola size)			10.00
No. 2 cast			9.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$8.75	to	$9.50
Scrap rails for melting	9.50	to	10.00
Loose sheet clippings	5.25	to	5.75
Bundled sheets	6.50	to	7.00
Cast iron borings	6.50	to	7.00
Machine shop turnings	6.00	to	6.50
No. 1 busheling	7.00	to	7.50
No. 2 busheling	4.00	to	4.50
Rails for rolling	10.00	to	10.50
No. 1 locomotive tires	9.50	to	10.00
Short rails	12.25	to	12.75
Cast iron carwheels	8.75	to	9.25
No. 1 machinery cast	10.00	to	10.50
No. 1 railroad cast	9.50	to	10.00
Burnt cast	7.00	to	7.50
Stove plate	7.00	to	7.50
Agricultural malleable	9.00	to	9.50
Railroad malleable	9.00	to	9.50

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$10.25	to	$10.75
Borings and short turnings	8.00	to	8.50
Long turnings	7.25	to	7.75
No. 1 machinery cast	11.00	to	11.50
Automotive cast	12.50	to	13.00
Hydraul. comp. sheets	10.75	to	11.25
Stove plate	8.00	to	8.50
New factory busheling	9.25	to	9.75
Old No. 2 busheling	6.50	to	7.00
Sheet clippings	7.50	to	8.00
Flashings	9.00	to	9.50
Low phos. plate scrap	10.75	to	11.25

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails, scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles, wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.05c.
Structural shapes	3.05c.
Soft steel bars and small shapes	2.85c.
Reinforcing steel bars	3.00c.
Cold-finished and screw stock—	
Rounds and hexagons	*3.45c.
Squares and flats	*3.45c.
Hoops and bands, under ¼ in.	3.10c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c.
Galv. sheets (No. 24), 25 or more bundles	3.70c.
Hot-rolled sheets (No. 10)	2.85c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.32
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count, 65 per cent off list.	
Machine bolts, 100 count, 65 per cent off list.	
Carriage bolts, 100 count, 65 per cent off list.	
Nuts, all styles, 100 count, 65 per cent off list.	
Large rivets, base per 100 lb.	$3.25
Wire, black, soft ann'l'd, base per 100 lb.	*2.575c.
Wire, galv. soft, base per 100 lb.	*2.925c.
Common wire nails, per keg	*2.557c.
Cement coated nails, per keg	*2.557c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plate sand structural shapes	3.10c.
Soft steel bars	2.90c.
Cold-fin. steel bars and shafting Rounds and hexagons	3.40c.
Flats and squares	3.40c.
Bands, 3/16 in. (in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.20c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.30c.
Hot-rolled sheets (No. 10)	2.85c.
Spikes (9/16 in. and lighter)	3.50c.
Track bolts	4.65c.
Rivets, structural (keg lots)	3c.
Rivets, boiler (keg lots)	3.10c.
	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex. tap or blank	60 and 5
Hex. head and cap screws	80
Cup point set screws	70
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$5.50 off list
No. 8 black ann'l'd wire per 100 lb.	$2.75
Com. wire nails, base per keg	2.70c.
Cement c't'd nails, base per keg	2.70c.

NEW YORK

	Base per Lb.
Plates	3.30c.
Structural shapes	3.27c.
Soft steel bars, small shapes	3.17c.
Iron bars	3.24c.
Iron bars, swed. charcoal	6.50 to 7.00c.
Cold-fin. shafting and screw stock; Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter-hard	4.00c.
Hoops	3.42c.
Bands	3.42c.
Hot-rolled sheets (No. 10)	3.17c.
Hot-rolled ann'l'd sheets (No. 24*)	3.65c.
Galvanized sheets (No. 24*)	4.25c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.30c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel, 1½ x ½ in. and larger	3.50c.
Open hearth spring steel, bases	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.00
	Per Cent Off List
Machine bolt, cut thread: ¾ x 6 in. and smaller	60
1 x 30 in. and smaller	60
Carriage bolts, cut thread: ½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.34c.
Bars, soft steel or iron	3.14c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Galv. sheets (No. 24)	4.54c.
Hot-rolled sheets (No. 10)	3.19c.
Black corrug. sheets (No. 24)	3.99c.
*Galv. corrug. sheets	4.59c.
Structural rivets	3.59c.
Boiler rivets	3.69c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	60
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts 1000 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.75c.
*Structural shapes	2.75c.
*Soft steel bars, small shapes, iron bars (except bands)	2.75c.
‡Reinforc. steel bars, sq. twisted and deformed	2.505c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.30c.
*Steel bands, No. 12 to 3/16 in., incl.	3.05c.
Spring steel	5.00c.
†Hot-rolled annealed sheets (No. 24)	3.40c.
‡Galvanized sheets (No. 24)	4.00c.
*Hot-rolled annealed sheets (No. 10)	2.95c.
Diam. pat. floor plates, ¼ in.	4.75c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For 5 tons or more, exclusive of cutting charge.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.21c.
Soft steel bars	2.90c.
Reinforc. steel bars	2.00c. to 2.50c.
Cold-finished steel bars	3.40c.
Flat rolled steel under ¼ in.	3.26c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.76c.
Galvanized sheets (No. 24)	4.36c.
Hot-rolled sheets (No. 10)	3.01c.
Black ann'l'd wire, per 100 lb.	$2.45
No. 9 galv. wire, per 100 lb.	2.80
Com. wire nails, base per keg	2.45

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.30c.
Bars, soft steel or iron	3.10c.
New billet reinforc. bars	3.10c.
Rail steel reinforc. bars	3.10c.
Hoops and bands, 3/16 in. and lighter	3.35c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.45c.
Hot-rolled sheets (No. 10)	3.10c.
Structural rivets	4.00c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg.	2.95
Chain. 1-in., per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.89
4-in.	41.69
Lap-welded steel boiler tubes, 2-in.	16.61
4-in.	38.72

BUFFALO

	Base per Lb.
Plates	3.27c.
Struc. shapes	3.15c.
Soft steel bars	2.95c.
Reinforcing bars	1.95c.
Cold-fin. flats and sq.	3.35c.
Round and hex.	3.25c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.15c.
Bands	3.32c.
Hoops	3.32c.
Hot-rolled unannealed sheets	3.07c.
Com. wire nails, base per keg	$3.00
Black wire, base per 100 lb.	3.25

BOSTON

	Per Lb.
Beams, channels, angles, tees, zees	3.42c.
H beams and shapes	3.42c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.43c.
Floor plates, diamond pattern	5.18c.
Bar and bar shapes (mild steel)	3.25c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.50c. to 4.50c.
Half rounds, half ovals, ovals and bevels	4.50c.
Tire steel	4.50c.
Cold-finished rounds and hexagons	3.70c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.20c.
Blue annealed sheets, No. 10 ga.	3.25c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Galvanized steel sheets, No. 24 ga.	4.60c.
Lead coated sheets, No. 24 ga.	5.65c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U.M.	3.50c.	3.40c.	3.40c.
Shapes, standard	3.50c.	3.40c.	3.40c.
Wide-flanged beams and columns	3.70c.	3.60c.	3.60c.
Soft steel bars	3.55c.	3.40c.	3.40c.
Reinforcing bars	2.35c.	2.35c.	2.35c.
Hot-rolled annealed sheets (No. 24)	4.25c.	4.15c.	4.25c.
Hot-rolled sheets (No. 10)	3.75c.	3.65c.	3.65c.
Galv. sheets (No. 24)	4.85c.	4.75c.	4.85c.
Struc. rivets, ½ in. and larger	6.25c.	6.00c.	5.00c.
Cold finished steel Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg	$3.35	$3.25	$3.45
less carload			

All items subject to differentials for quantity.

Reinforcing Steel

Awards 6725 Tons—New Projects 4150 Tons

AWARDS

New York, 350 tons, mesh for midtown post office, to American Steel & Wire Co.

Nassau and Queens Counties, N. Y., 370 tons, highway construction, to Capitol Steel Co.

Essex and Nassau Counties, N. Y., 325 tons, highway construction, to Kalman Steel Corpn.

Queens County, N. Y., 100 tons, Interboro Parkway grade separation, to Igoe Brothers.

Auburn, N. Y., 100 tons, prison building, to Capitol Steel Co.

Washington, 920 tons, sewer at Bolling Field, to Concrete Steel Co.

Lawrenceburg, Ind., 350 tons, distillery, to Pollak Steel Co.

Henry, Ill., 185 tons, bridge, to Concrete Steel Co.

Chicago, 100 tons, Ford exhibit at World's Fair, to Truscon Steel Co.

State of Montana, 170 tons, highway work in two counties, to unnamed bidders.

Fort Peck, Mont., 100 tons, bridge over Missouri River, to an unnamed bidder.

San Diego County, Cal., 130 tons, State bridge, to Soule Steel Co.

Los Angeles County, Cal., 105 tons, State bridge over Ramona Boulevard, to an unnamed bidder.

Boulder Dam, 3000 tons, to Sheffield Steel Co.

State of Colorado, 120 tons, highway work in three counties, to unnamed bidders.

State of California, 100 tons, highway work in three counties, to unnamed bidders.

Albrook Field, Canal Zone, 200 tons, post building at Army Air Base, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Camden, N. J., 1700 tons, Camden approach to Philadelphia-Camden bridge; bids asked this week.

Cleveland, 220 tons, service station for Firestone Tire & Rubber Co.

Hammond, Ind., tonnage being estimated, sewage treating plant.

Chicago, 530 tons, sewer project No. 8 for Sanitary District.

State of Illinois, 500 tons, paving.

Chicago, 800 tons, preliminary estimate, building for Sears, Roebuck & Co.

Tulare County, Cal., 115 tons, State paving, bids March 14.

Boulder Dam, 150 tons, Specification No. 23,096-A; bids under advisement.

Los Angeles, 120 tons, State overhead crossing; bids March 14.

Pipe Lines

United States Engineer Office, Missouri River Division, Postal Telegraph Building, Kansas City, Mo., asks bids until March 26 for about 3½ miles all-steel welded pipe for suction dredge service, Fort Peck dam and reservoir project, Mont., to be furnished in short lengths, including 320 pieces, 28-in. diameter, ½-in. steel; 320 pieces, 28-in. diameter, ¼-in. steel and 800 pieces, 16-in. diameter, 10-gage steel, with fittings, etc.

Long Beach, Cal., will take bids at once for about 125,000 lin. ft. of seamless electric-welded steel pipe for city gas department. James H. Bonner, city manager, is in charge.

Cedar Rapids, Iowa, plans installation of 12-in. and smaller steel pipe for extensions in gas distribution system. C. H. Streeter is city engineer.

McKnab Oil & Gas Co., Winfield Kan., subsidiary of Phillips Petroleum Co., Bartlesville, Okla., is considering natural gas steel pipe line at St. Louis and vicinity. Company has tendered proposal to city.

Redlands, Cal., will take bids soon on 400 tons of sheets for 20 and 22-in. pipe line.

Long Beach, Cal., will take bids March 8 on 290 tons of sheets for 1 to 4 in. pipe.

Los Angeles, has awarded 290 tons of 20-in. pipe for Metropolitan Water District, to Consolidated Steel Corpn.

The operating rate of the steel industry for the week beginning March 5 was 47.7 per cent as compared with 45.7 per cent last week, according to the American Iron and Steel Institute.

CONSISTENT specification of Wyckoff Cold Drawn Bars will assure you of bar stock that is absolutely uniform, unvarying in cross section and readily machinable. Such precision and perfection are obtainable only with COLD DRAWN STEEL BARS, as produced by the Wyckoff organization.

As the largest exclusive manufacturer of Cold Drawn Steels, we are in a position to show how you may effect many worth-while economies in the selection of YOUR steel. Let us cooperate with you.

WYCKOFF DRAWN STEEL COMPANY

GENERAL OFFICES—Ambridge, Penna.
MILLS—Ambridge, Penna. and Chicago, Ill.

Spelter Sales Exceed 3200 Tons; About 1000 Tons Sold at 4.42½c., St. Louis

March Lead Bookings Already Total More Than 23,000 Tons; Copper Firm But Inactive at 8c.—Straits Tin Quiet

NEW YORK, March 6.—The domestic market for electrolytic copper continues to be inactive, but demands from abroad are in sufficient volume to enable both custom and mine interests to dispose of good tonnages every day. The price basis here is still nominally 8c. a lb., delivered Connecticut points, for shipments into June. Deliveries to fabricators are in improved volume, and it is expected that February shipments will exceed January by at least 5 per cent. The trade is much interested in this indication of better fabricating activity, and also in the questionnaires on production and marketing recently returned to the NRA by mine producers and custom smelters. Codification hearings are now scheduled to begin on March 12, and it is expected in many quarters that the Government will again attempt to include some operating and marketing restrictions in the code. There is some European speculation in copper, but recent business is mostly from consumers, especially makers of munitions. American offerings of electro are dominating the standard market, and, at present, the European and African producers are somewhat resigned to the active competition of American custom smelters. Exchange variations have also influenced prices abroad, and quotations during the week ranged from 8.10c. to 8.37½c. a lb., c.i.f. Hamburg, Havre and Liverpool.

Tin

Mill stocks are thought to be fairly well absorbed, but consumers are showing no inclination to purchase additional supplies. Straits and refined grades are nominally available today at 52.62½c. a lb., New York, which is the highest price asked since early January. Although this market is inactive, London has been enlivened by fair trading throughout the week. Prices abroad advanced approximately £2 during the week, and first call postings today were £229 17s. 6d. for spot and £228 10s. for future standard, and £231 15s. for Straits at Singapore. Domestic tin stocks declined about 1000 tons to 7014 tons in February, and the world's visible stocks are now at the lowest level since November, 1928. Tin consumption in the United States is now about 2700 tons monthly.

Zinc

Stocks of concentrates in the Tri-State district have declined and demands for refined metal have distinctly improved. The tone of the present selling market is quite steady, but Prime Western is still available in some directions at 4.40c. a lb., East St. Louis, for May delivery. Spelter bookings last week totaled 3200 tons, about 30 per cent of which was sold for March and June at 4.42½c. a lb., which compares favorably with the 2000 tons sold at 4.40c. during each of the two preceding weekly periods. The Joplin ore market continues to be firmly quoted at $30 a ton for all grades. Output during the week totaled 5000 tons, and sales exceeded 4500 tons. About 5150 tons was shipped, and visible stocks closed the week 150 tons lower at 13,500 tons.

Lead

Major sellers in the East and West report consistent purchases somewhat in excess of average daily ore intakes. Consequently, the market continues firm at 3.90c. a lb., St. Louis, and 4c., New York, for all delivery positions through April. February sales of primary lead aggregated over 28,000 tons, March is already heavily covered at 23,000 tons, and April bookings total more than 6500 tons. The flow of metal into ultimate consumption apparently is improving, and, in addition, producers are expecting a seasonal increase in demands within the next month.

Antimony

Consumer demands are negligible, but the price basis is nominally strong at 7.30c., f.o.b. New York. The price buoyancy here is a direct reflection of higher European bids and the selling reserve of American importers. Futures are reported to be available at 5.65c. a lb., c.i.f. New York, but the price is wholly nominal in the absence of trading.

Brass and Bronze

The combined January deliveries of ingot brass and bronze made by members of the Non-Ferrous Ingot Metal Institute totaled 4053 tons, as compared with 2145 tons delivered in December. The average prices paid during February by consumers of commercial 85-5-5-5 ingots and commercial 80-10-10 (1 per cent impurities) ingots were 8.172c. and 9.948c. a lb. respectively.

The Week's Prices. Cents Per Pound for Early Delivery

	Feb. 28	March 1	March 2	March 3	March 5	March 6
Electrolytic copper, N. Y.*	7.75	7.75	7.75	7.75	7.75	7.75
Lake copper, N. Y.	8.00	8.00	8.00	8.00	8.00	8.00
Straits tin, Spot, N. Y.	52.35	52.40	52.50	....	52.62½	52.62½
Zinc, East St. Louis	4.40	4.40	4.40	4.40	4.40	4.40
Zinc, New York	4.75	4.75	4.75	4.75	4.75	4.75
Lead, St. Louis	3.90	3.90	3.90	3.90	3.90	3.90
Lead, New York	4.00	4.00	4.00	4.00	4.00	4.00

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98-99 per cent, 22.90c. a lb. delivered; new No. 12, 20c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 16c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 7.30c. a lb., New York.
Brass ingots, 85-5-5-5, 8.00c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	53.50c. to 54.50c.
Tin, bar	55.50c. to 56.50c.
Copper, Lake	9.75c. to 10.50c.
Copper, electrolytic	9.50c. to 10.00c.
Copper, castings	9.25c. to 10.25c.
*Copper sheets, hot-rolled	15.00c.
*High brass sheets	13.75c.
*Seamless brass tubes	16.25c.
*Seamless copper tubes	16.25c.
*Brass rods	12.25c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks	9.75c. to 10.00c.
Lead, American pig	4.75c. to 5.75c.
Lead, bar	5.75c. to 6.75c.
Lead, sheets	7.75c.
Antimony, Asiatic	8.75c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	32.00c. to 33.00c.
Babbitt metal, commercial grade	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	9.00c.
Copper, electrolytic	9.00c.
Copper, castings	8.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	5.00c. to 5.25c.
Lead, bar	8.00c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	62.00c.
Solder, ½ an ½	34.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.50c.	7.25c.
Copper, hvy. and wire	6.25c.	7.00c.
Copper, light and bottoms	5.25c.	6.25c.
Brass, heavy	3.50c.	4.25c.
Brass, light	3.00c.	3.625c.
Hvy. machine composition	4.75c.	5.625c.
No. 1 yel. brass turnings	4.25c.	5.125c.
No. 1 red brass or compos. turnings	4.25c.	5.25c.
Lead, heavy	3.00c.	3.625c.
Zinc	2.50c.	3.125c.
Cast aluminum	9.50c.	11.25c.
Sheet aluminum	12.25c.	13.50c.

Pig Iron Output Up 15.1 Per Cent In February

PRODUCTION of coke pig iron in February totaled 1,263,673 gross tons, compared with 1,215,226 tons in January. The daily output in February, at 45,131 tons, showed a gain of 15.1 per cent over the January daily rate of 39,201 tons.

There were 89 furnaces in blast on March 1, making iron at the rate of 46,260 tons a day, compared with 87 furnaces on Feb. 1, operating at the rate of 41,085 tons a day. Seven furnaces were blown in during February and five were blown out or banked, making a net gain of two furnaces. The Steel Corporation put in two furnaces, independent steel companies put four in, and merchant producers put one in and five out.

Among the furnaces blown in are the following: One Lackawanna, Bethlehem Steel Co.; one Monessen, Pittsburgh Steel Co.; one Shenango, Shenango Furnace Co.; one Riverside, Wheeling Steel Corpn.; one River, Corrigan, McKinney Steel Co., and two South Chicago (old) furnaces of the Illinois Steel Co.

Furnaces blown out or banked include: One Port Henry, Witherbee, Sherman & Co.; one Swede, Alan Wood Steel Co.; one Sheridan, Lavino Furnace Co.; the Neville Island furnace, Davison Coal & Coke Co., and the Jisco furnace of the Jackson Iron & Steel Co.

Daily Average Production of Coke Pig Iron

Gross Tons

	1934	1933	1932	1931
January	39,201	18,348	31,380	55,299
February	45,131	19,798	33,251	60,950
March	.....	17,484	31,201	65,556
April	.....	20,787	28,430	67,317
May	.....	28,621	25,276	64,325
June	.....	42,166	20,935	54,621
½ year	.....	24,536	28,412	61,356
July	.....	57,821	18,461	47,201
August	.....	59,142	17,115	41,308
September	.....	50,742	19,753	38,964
October	.....	43,754	20,800	37,848
November	.....	36,174	21,042	36,782
December	.....	38,131	17,615	31,625
Year	.....	36,199	23,733	50,069

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1934	1933	1934	1933
January	1,215,226	568,785	11,703	8,810
February	1,263,673	554,330	10,818	8,591
March	.....	542,011	.....	4,783
April	.....	623,618	.....	5,857
May	.....	887,252	.....	5,948
June	.....	1,265,007	.....	13,074
½ year	.....	4,441,003	.....	47,063
July	.....	1,792,452	.....	18,661
August	.....	1,833,394	.....	16,953
September	.....	1,522,257	.....	13,339
October	.....	1,356,361	.....	16,943
November	.....	1,085,239	.....	14,524
December	.....	1,182,079	.....	9,369
Year	.....	13,212,785	.....	136,852

*These totals do not include charcoal pig iron. The 1932 production of this iron was 15,055 gross tons.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1934	1933	1932
January	7,800	2,602	6,256
February	7,071	2,863	7,251
March	....	2,412	7,157
April	....	1,908	5,287
May	....	3,129	4,658
June	....	4,088	6,090
July	....	6,783	3,329
August	....	7,756	3,070
September	....	10,034	3,213
October	....	8,634	4,286
November	....	7,639	4,435
December	....	8,358	3,674

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) February (28 Days)	Production (Gross Tons) January (31 Days)	March 1 Number in Blast	March 1 Operating Rate, Tons a Day	February 1 Number in Blast	February 1 Operating Rate, Tons a Day
New York:						
Buffalo	75,789	77,124	6	3,375	5	2,490
Other New York and Mass.	6,778	12,933	1	205	2	415
Pennsylvania:						
Lehigh Valley	28,886	27,213	3	1,030	3	910
Schuylkill Valley	16,459	24,003	1	350	2	775
Susquehanna and Lebanon Valleys	17,344	8,533	1	620	1	390
Ferromanganese	1,430	2,256	0	....	1	75
Pittsburgh District	216,317	195,640	15	7,695	15	6,540
Ferro. and Spiegel	3,988	3,510	1	140	1	115
Shenango Valley	17,074	17,516	2	835	1	565
Western Pennsylvania	23,652	39,587	2	845	2	1,275
Ferro. and Spiegel	....	....	0	....	0	....
Maryland	61,889	59,338	3	2,210	3	1,905
Wheeling District	80,979	83,696	6	3,175	5	2,925
Ohio:						
Mahoning Valley	145,854	117,080	8	5,210	8	4,640
Central and Northern	175,806	152,494	11	6,340	10	4,920
Southern	21,298	21,379	2	590	3	690
Illinois and Indiana	187,984	184,766	11	7,135	9	5,960
Mich. and Minn	42,094	44,925	3	1,505	3	1,450
Colo., Mo. and Utah	14,764	16,670	2	525	2	540
The South:						
Virginia	....	....	0	....	0	....
Kentucky	12,184	9,918	1	435	1	320
Alabama	107,704	110,708	9	3,845	9	3,995
Ferromanganese	5,400	5,937	1	195	1	190
Tennessee	....	....	0	....	0	....
Total	1,263,673	1,215,226	89	46,260	87	41,085

1933 Betterments Cost Y. S. & T. $2,351,839

YOUNGSTOWN SHEET & TUBE CO. spent $2,351,839 for improvements and betterments of plants during 1933, it was stated in the company's annual report.

In the Chicago district major betterments were at the Indiana Harbor works and consisted of new equipment for cold-rolling at the tin mill, extension of merchant mill facilities for rolling and handling alloy steels and additional tie-plate units.

In the Youngstown district a railroad spike plant was added at the Campbell works.

Further betterments, enabling still further diversification of products, are contemplated during 1934, including equipment to extend range of sizes of welded pipe and the installation of a Steckel mill for the production of coil strips for cold rolling into tie-plates in conjunction with its universal plate mill at its Indiana Harbor works.

Proposes Shorter Week for Common And Longer Week for Skilled Labor

WASHINGTON, March 6.—Addressing the employment group of the NRA code conference today, Deputy Administrator George S. Brady proposed a 36-hr. week for common labor and as high as a 60-hr. week for skilled labor in the foundry, machine shop and sheet metal working industries. The suggestion was made in the form of an amendment to codes covering these industries. Common labor would not be permitted to work more than eight hours a day or more than 36 hours during any six days until employment had reached a normal level acceptable to the administrator and until administrative order to that effect is issued.

Draftsmen, designers, toolmakers and highly skilled mechanics receiving more than $35 a week in peak seasons could work 12 hours a day and not more than 60 hours a week, provided that one and one-half times the regular rate shall be paid for all hours worked in excess of eight hours a day and 36 hours a week. It is also provided that these hours could be applied if such employees cannot be supplemented by the work of additional part or full time employees. The proposed amendment which met with objections would become effective on the third Monday after its approval by the President.

New Prices Filed With Institute

THE following lowest base prices have been filed with the American Iron and Steel Institute:

	Base Price Per 100 Lb.	F.O.B. Basing Point
Annealed fence wire (effective March 10).....	$2.90	Pacific Coast Ports
Galvanized fence wire (effective March 10)..	3.25	Pacific Coast Ports
Galvanized rejects known sizes (effective March 11) No. 10 gage and heavier	1.40	(No. 24 ga.) Pittsburgh
No. 11 and 12 gage.....	1.50	(No. 24 ga.) Gary, Ind.
Galvanized wasters, random sizes (March 11) No. 10 gage and heavier	1.40	(No. 24 ga.) Pittsburgh
No. 11 and 12 gage....	1.50	(No. 24 ga.) Gary, Ind.
Annealed stone wire (March 3).....	4.20	Pittsburgh
Galvanized stone wire (March 3).....	5.20	Pittsburgh
*Stapling wire (8-in. Coils) (March 2).....	3.85	Chicago
Stapling wire (8-in. Coils) (March 2).....	4.45	Pacific Coast Ports

*Effective this date as the result of a member of the code withdrawing its base prices for these basing points.

Foundry Dust Problem

THE three main phases of the dust problem in the foundry were made the subject of a good housekeeping conference so-called conducted by the American Foundrymen's Association at Chicago last June. The papers and discussions are available in pamphlet form at 50c. a single copy and 15c. in lots of 10. They may be obtained from the association, the executive offices of which are at 222 West Adams Street, Chicago. What constitutes dust hazards and how to take dust counts, how to keep dust under control once it is eliminated and what is the employer's liability under the statutes are the divisions of the subject encompassed by the publication. It is brought out that many foundries are in a position to make their plants clean and orderly without undue expenditure of money, and the pamphlet essays to refute the idea that a good system of control is necessarily too expensive to install.

Non-Ferrous Averages

THE average prices of the major non-ferrous metals for February, based on daily quotations in THE IRON AGE, are as follows:

	Average
Electrolytic copper, N. Y.*.....	7.75c. a lb.
Lake copper, New York.....	8.00c. a lb.
Straits tin, Spot, N. Y.....	51.78c. a lb.
Zinc, East St. Louis.....	4.38c. a lb.
Zinc, New York.....	4.73c. a lb.
Lead, St. Louis.....	3.90c. a lb.
Lead, New York.....	4.00c. a lb.

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Scrap Higher at Detroit

DETROIT, March 6.—With demand for scrap continuing at a high level, dealers are paying 50c. a ton more for most grades than they were a week ago, hoping thereby to bring into the market tonnages which have been in storage throughout this district. Heavy melting steel is commanding $10.75 a ton, but for select lots $11 is being offered. Hydraulic bundles for delivery to the local steel plant are being bought at a top price of $11. Cast iron grades are especially strong, not only because of capacity operations by automotive foundries but also because of liberal movement to a Mansfield, Ohio, steel mill which uses considerable quantities of cast scrap in place of pig iron in its open-hearth melt. It is estimated that local dealers have approximately 100,000 tons of scrap on docks here awaiting water shipments to Cleveland and Buffalo mills as soon as the Lake navigation season opens, probably late this month.

National Income Gained In 1933

THE national income produced in the United States in 1933 amounted to $39.8 billion, according to a preliminary estimated announced March 5 by the National Industrial Conference Board. This represents an increase of $1.5 billion, or 3.7 per cent over the total of $38.3 billion for 1932. Income per capita of the total population was $316 in 1933, as compared with $307 in 1932.

In the three years, 1930 to 1932, the national income declined continuously, from $83 billion in 1929, to $70.5 billion in 1930, to $54.7 billion in 1931, and to $38.3 billion in 1932. The figures on a per capita basis show even more strikingly than do those of total national income the decline that took place from 1929 to 1932. These figures are: 1929, $683; 1930, $572; 1931, $440; 1932, $307. In 1932 per capita income was the lowest in 24 years, being only $7 above the per capita figure for 1909, the first year in the Conference Board's series of national income estimates.

ESTIMATES OF NATIONAL INCOME PRODUCED, 1909-1933

Year	National Income: Total, Billion, Dollars	National Income: Per Capita	Per Gainful Worker, Including Unemployed	Index of Wholesale Prices, All Commodities, Base, 1926=100
1909	27.2	$300	$716	67.6
1910	30.1	326	785	70.4
1911	29.4	314	761	64.9
1912	31.8	334	814	69.1
1913	33.7	350	857	69.8
1914	32.0	327	806	68.1
1915	34.5	347	860	69.5
1916	44.2	439	1,093	85.5
1917	53.2	521	1,304	117.5
1918	60.2	581	1,463	131.3
1919	67.4	642	1,623	138.6
1920	74.3	697	1,770	154.4
1921	52.6	486	1,233	97.6
1922	61.7	562	1,423	96.7
1923	69.8	626	1,584	100.6
1924	69.6	615	1,555	98.1
1925	77.1	671	1,695	103.5
1926	78.5	674	1,699	100.0
1927	77.2	653	1,647	95.4
1928	80.5	671	1,691	96.7
1929	83.0	683	1,719	95.3
1930	70.5	572	1,439	86.4
1931	54.7	440	1,108	73.0
1932	38.3(1)	307(1)	772(1)	64.8
1933	39.8(1)	316(1)	795(1)	65.9

(1)Preliminary estimate.

Fabricated Structural Steel

Lettings in Good Volume—New Projects Higher

AWARDS of 21,800 tons, the largest since the second week in January, were swelled by 12,300 tons for the midtown post office annex in New York. Two lettings of 1750 tons each were for Government radio towers at Pearl Harbor, Hawaii, and Summit in the Canal Zone. New projects of 13,000 tons compare with 7200 tons last week and 10,825 tons two weeks ago. New jobs include 3500 tons for the Army Air Corps at Middletown, Pa., and 1800 tons for a store in Indianapolis. Plate awards total 6750 tons. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

New York, 12,300 tons, midtown post office annex, to McClintic-Marshall Corpn.

Elmira, N. Y., 320 tons, State reformatory building, to McClintic-Marshall Corpn.

Philadelphia, 135 tons, building, to Bethlehem Fabricators, Inc.

Pittsburgh, 1035 tons, post office ramp to Fort Pitt Bridge Works Co.

State of Pennsylvania, 540 tons, highway bridge, to Phoenix Bridge Co.

Aberdeen, Md., 320 tons, storehouses, to Reading Steel Products Co.

Camden, N. J., 480 tons, five bridges for Pennsylvania Railroad, to American Bridge Co.

Gordon, Pa., 180 tons, bridge for Reading Railroad, to McClintic-Marshall Corpn.

SOUTH AND SOUTHWEST

State of Virginia, 1480 tons, highway bridges; 1230 tons to Virginia Bridge & Iron Co., and 250 tons to Roanoke Iron & Bridge Works.

Craig County, Okla., 180 tons, highway bridge, to J. B. Klein Iron & Foundry Co.

Fort Sam Houston, Tex., 155 tons, ordnance shop, to Alamo Iron Works.

Fort Sam Houston, 370 tons, warehouses, to Houston Structural Steel Co.

CENTRAL STATES

State of Ohio, 185 tons, Ross County bridge, to Burger Iron Co.

Chicago, 295 tons, slabs and column cores for Becker-Ryan store to an unnamed bidder.

St. Louis, 100 tons, building, to Banner Iron Works, St. Louis.

WESTERN STATES

Los Angeles, 240 tons, extension for Douglas Aircraft Co., Inc., to Consolidated Steel Corpn.

San Francisco, 125 tons, cassion work on Trans-Bay bridge to Moore Dry Dock Co.

San Francisco, 100 tons, trusses for Forest Service, to Golden Gate Iron Works.

Santa Barbara, Cal., 150 tons, sheet piling, Pacific Western Oil Co. pier, to an unnamed bidder.

State of Oregon, 430 tons, siphon bridge on Owyhee project, to Chicago Bridge & Iron Works.

Pearl Harbor, T. H., 1750 tons, radio towers at Navy Base, to United States Steel Products Co.

Summit, Canal Zone, 1750 tons, radio towers at Navy Base, to United States Steel Prodnets Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Rochester, N. Y., 1000 tons, John Marshall High School.

Camden, N. J., 2700 tons, sheet piling, Camden approach to Philadelphia-Camden Bridge; bids to be asked this week.

Cape May, N. J., 1300 tons, sheet piling for bulkheads; bids close March 13.

Middletown, Pa., 3500 tons, buildings for Army Air Corps.

Aberdeen, Md., 200 tons, Government building.

Washington, 275 tons, Gordon Strong building.

THE SOUTH

Richmond, Va., 700 tons, parcel post building.

Charlottesville, Va., 200 tons, Rivanna River bridge.

Norfolk, Va., 685 tons, bascule bridge spans.

State of Mississippi, 365 tons, highway bridges.

State of Texas, 600 tons, bridges.

CENTRAL STATES

State of Ohio, 150 tons, Marion County bridge, bids March 9.

Dover, Ohio, 100 tons, mill building for Greer Steel Co.

Indianapolis, 1800 tons, addition to Block store.

Chicago, 275 tons, plant addition for Wilson & Co. at Union Stockyards.

South Chicago, 400 tons, limestone pockets for International Harvester Co.

Beloit, Wis., 500 tons, alterations and addition to high school.

Camp Douglas, Wis., 200 tons, Government building.

State of Iowa, 250 tons, bridges.

Des Moines, Iowa, 200 tons, fine arts building.

Finlayson, Minn., 325 tons, bridge.

WESTERN STATES

Fort Peck, Mont., 250 tons, building.

San Francisco, 100 tons, trusses for Forest Service; bids under advisement.

Government Island Cal., 3300 tons sheet piling, bulkhead for Coast Guard Service, bids March 1.

Oakland, Cal., 480 tons additional, tunnel ventilating buildings; bids March 22.

Sacramento County, Cal., 356 tons, sheet piling, widening State bridge; bids March 14.

San Francisco, 150 tons, towers for Forest Service; bids under advisement.

Sweetwater County, Wyo., 120 tons, State bridge; bids March 15.

FABRICATED PLATE

AWARDS

Washington, 1360 tons, two dredges for Missouri River, to Marietta Mfg. Co., Mt. Pleasant, W. Va.

Vicksburg, Miss., 325 tons, mooring barges for United States Engineers, to Jones & Loughlin Steel Corpn.

Temple, Tex., 410 tons, water tank, to Chicago Bridge & Iron Works.

Richmond, Ind., 200 tons, tank to Western Gas Construction Co.,

Mitchell, S. D., 150 tons, tank to Pittsburgh-Des Moines Steel Co.

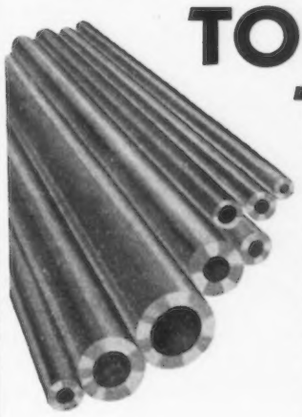
Fort Peck, Mont., 3150 tons, pipe line, to McClintic-Marshall Corpn.

State of Oregon, 900 tons, siphons on Owyhee project, to Chicago Bridge & Iron Works.

Albrook Field, Canal Zone, 250 tons, pipe line at Army Air Base to an unnamed bidder.

NON-SHRINK, OIL HARDENING

TOOL STEEL TUBING



The job of making ring dies, cutting dies, bushings spacers, etc., is half done when you start with Bissett Tool Steel Tubing. There is a size carried in stock to meet every requirement up to 12" O.D. and 2" wall thickness. Larger sizes can be supplied.

It eliminates forging, does away with annealing difficulties and cuts down machining cost.

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Cincinnati Worcester Buffalo

PLANT EXPANSION AND EQUIPMENT BUYING

Skilled Labor Shortage Faces Machine Tool Industry

NO change is evident this week in the volume of machine tool orders. In Cincinnati the demand for millers and grinders continues unabated, although automotive business has been displaced by more general demand. Current orders are for rush shipment but large quantities are not in evidence, prevailing demand being for single tools.

The National Association of Machine Tool Builders reports an index drop of from 126.2 in December, 1933, to 101.7 in January, 1934. This is due wholly to the reduction in orders placed for foreign delivery. Domestic business continues its encouraging uptrend.

A shortage in the supply of skilled labor is making itself felt in the machine tool industry. Many builders are wrestling with the problem of securing capable help and some are now being forced to weed out unsuitable material. It is probably because of this shortage that there has been a lower shipping rate in the industry in January, while unfilled orders are piling up.

◀ NEW ENGLAND ▶

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 13 for one motor-driven grinding machine (Schedule 1891), 150 steel drums, each 55-gal. capacity (Schedule 1873), for Newport, R. I., Navy Yard.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has plans for new bulk oil storage and distributing plant at Plymouth, Mass. Cost over $50,000 with equipment.

Slater Mfg. & Engineering Co., Boston, has been organized by Charles B. Simoneau and Ralph S. Taylor, 133 Bellevue Avenue, Melrose, Mass., to manufacture heating equipment.

Board of Selectmen, Chicopee, Mass., J. J. Desmond, Jr., superintendent of schools, asks bids at once on general contract for new multi-story junior high school. Manual training department will be installed. Cost $250,000. H. J. Tessler, 220 Dwight Street, Springfield, Mass., is architect.

Eureka Split Ball Bearing Co., Randolph, Mass., has been organized by Thomas H. and J. N. Irving, 120 Old Street, and associates, to manufacture ball bearings and kindred products.

Town School Board, Hanover, N. H., will take bids soon on general contract for two-story junior and senior high school. Manual training department will be installed. Cost $185,000. Wells, Hudson & Granger, Main Street, are architects.

◀ NORTH ATLANTIC ▶

Continental Can Co., 1 Pershing Square, New York, will take bids at once for two-story addition to branch plant at Los Angeles, 174 x 200 ft. Cost about $150,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Board of Education, Huntington, L. I., will take bids soon on general contract for new multi-story senior and junior high school with manual training department. Fund of $550,000 has been arranged. R. Burdick, school superintendent, is in charge.

Meissner Mfg. Co., 2815 West Nineteenth Street, Chicago, manufacturer of electric coils, radio parts, etc., has leased about 7000 sq. ft. in building at 121 West Seventeenth Street, New York, for new Eastern branch.

John Mandel, Inc., Bronx, New York, has been organized by John Mandel, 3671 Broadway, New York, and Herbert Pearl, 3817 Avenue M, Brooklyn, to manufacture sheet metal products.

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until March 12 for three acetylene buoys, complete with illuminating apparatus (Proposal 45665); also for eight acetylene flashers (Proposal 45701).

Pan-American Petroleum & Transport Co., 122 East Forty-second Street, New York, is considering erection of second unit at new oil refinery at Texas City, Tex., closely duplicating first unit, now nearing completion. Cost of present unit over $3,000,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 13 for 350 storage battery testing equipments (Schedule 1858) for Brooklyn Navy Yard; two gasoline engine-operated tractors and two rotary scrapers (Schedule 1901), and one industrial wheel-type tractor (Schedule 1885) for Brooklyn or Philadelphia yard.

Board of Education, Westhampton Beach, L. I., plans manual training department in new high school. Fund of $390,000 is being secured through Federal aid.

C. D. Wood Electric Co., 565 Broadway, New York, manufacturer of electric wiring devices and equipment, has leased space in building at 826-28 Broadway, for expansion.

Diesel Equipment Corpn., New York, has been organized by Walter E. Buttle, 198 Washington Avenue, Brooklyn, and associates, to manufacture Diesel engines and equipment.

Chase Craft Mount Co., Inc., 38 East Twenty-first Street, New York, manufacturer of lamp mountings and equipment, has leased space in building at 33-35 East Twenty-first Street for plant.

Morgen Distilling Corpn., Jersey City, N. J., recently organized, has leased 5000 sq. ft. in three-story building at 107-9 Hudson Street, for new blending and rectifying plant.

Board of City Commissioners, City Hall, Newark, N. J., Meyer C. Ellenstein, mayor, has made application for Federal loan for $30,000,000 for construction of proposed municipal electric light and power plant, acting for Newark Taxpayers' Association. Department of Parks and Public Property will be in charge.

Weeden's Machine Shop, Inc., Asbury Park, N. J., has been organized by Clarence Weedon, 907 Fourth Avenue, and associates, to operate a machine and repair shop.

Commanding Officer, Frankford Arsenal, Philadelphia, asks bids until March 12 for one electric spot welding machine for welding base covers on shells (Circular 340), and 24,855 lb. copper rotating bands (Circular 331).

City Council, Lancaster, Pa., will begin work soon on new municipal airport, with hangar, reconditioning and repair shop, oil storage and distributing building, and other field structures. Fund of $200,000 has been arranged.

Board of Harbor Commissioners, foot of Christiana Avenue, Wilmington, Del., plans improvements at municipal marine terminal, including new locomotive shed and shop, pumping station, and cargo mast for handling equipment. Fund of $56,000 has been authorized.

John S. Smith, Seaford, Del., operating a shipbuilding and repair plant at part of former Seaford Shipyard, Nanticoke River, has taken over entire plant and will expand facilities for steel and other boat-building and repair work.

◀ OHIO AND INDIANA ▶

Great Northern Distilleries, Inc., Fostoria, Ohio, care of Don C. Hanover, Fostoria, president, recently chartered with capital of $1,000,000, has plans by H. W. Hannah, 118 Massachusetts Avenue, Detroit, architect, for new plant fronting on Nickel Plate Railroad, to include power house, machine shop and other mechanical departments. Cost about $350,000 with equipment. C. H. Stone, Fostoria, will be manager.

Dayton Malleable Iron Co., Dayton, Ohio, has taken over Elite Mfg. Co., Ashland, Ohio, manufacturer of automobile jacks and kindred equipment, and plans removal to main works at Dayton, where expansion will be carried out.

Department of Public Works, City Hall, Columbus, plans two new refuse and garbage incinerator plants, with furnaces, conveyors, loaders and other equipment. Cost $202,000 with machinery. Federal financing has been arranged. Erwin Rossbach, City Hall, is architect.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until March 14 for exhaust cylinder stack assemblies and oil temperature regulator support bracket assemblies (Circular 320).

Distillers Brands, Inc., Cincinnati, recently organized, care of Carl J. Kiefer, Schmidt Building, consulting engineer, has taken over former factory of Heekin Can Co., West Sixth Street, and will remodel for new rectifying and blending works. Cost over $35,000 with equipment.

Constructing Quartermaster, Fairfield Air Depot, Patterson Field, Fairfield, Ohio, asks bids until March 12 for new electric distribution system, substation and auxiliary equipment.

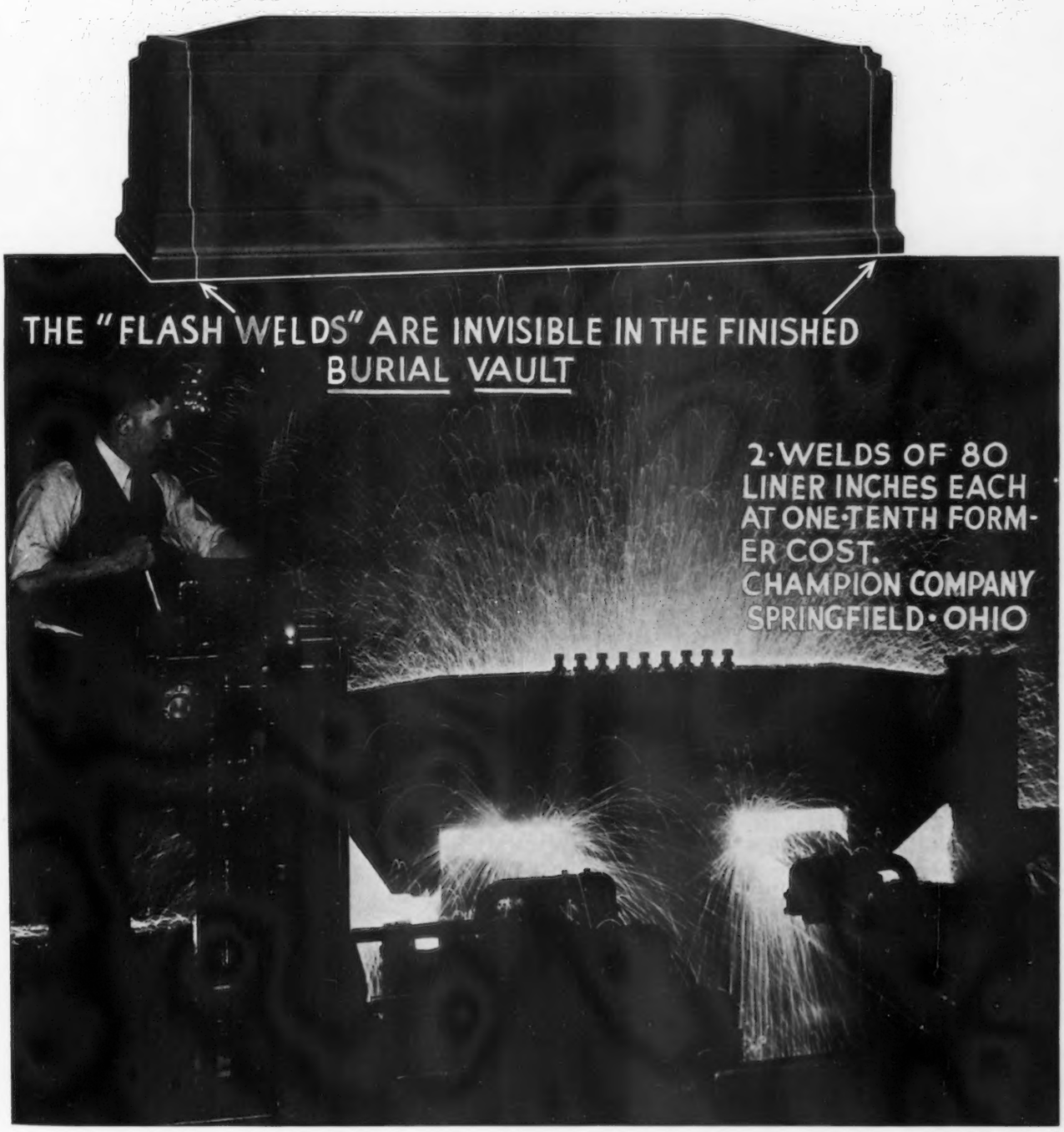
City Council, Hamilton, Ohio, R. P. Price, city manager, plans installation of pumping machinery and other equipment, water-softening equipment, pipe lines, etc., for extensions and improvements in municipal waterworks. Fund of $900,000 is being arranged for work. Barstow & LeFebre, Akron, Ohio, are engineers.

Cloverdale Municipal Water & Power Corporation, Cloverdale, Ind., care of Estes Duncan, Cloverdale, president, recently organized, plans new hydroelectric generating plant on Eel River, including power dam at Cataract Falls, with power station, transmission lines, substations and other structures. Development will include a water supply project and to cost $2,312,000 with equipment. Federal financing is being arranged. George Ackerman, 20 North Wacker Drive, Chicago, is consulting engineer.

Sterling Brewery, Evansville, Ind., has plans for extensions and improvements in three-

Federal "WELDING"

INSURES PERMANENCE TO THE LAST RESTING PLACE OF THOSE PASSED ON.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Chicago—15 So. Clinton St.
Cleveland—922 Fidelity Bldg.
Detroit—2832 E. Grand Blvd.
Philadelphia—Bourse Bldg.
Los Angeles—Smith Booth Usher Co., 2001 Santa Fe Ave.
New York City—Room 569, 50 Church St.
Pittsburgh—Dravo Doyle Co., Rush Machinery Division, Dravo Bldg.
San Francisco—Roberts Moore Machinery Co., 550 Fifth St.
St. Louis—Halpin Company, 4116 Clayton Ave.

story storage and distributing plant. Cost about $30,000 with equipment. Fowler & Legeman, Central Union Building, are architects.

BUFFALO DISTRICT

Board of Education, Jamestown, N. Y., plans early call for bids for new industrial arts building, new senior high school with manual training department and three additions to junior high schools with manual training facilities. Fund of $1,220,000 has been secured through Federal aid. Beck & Tinkham, Bailey Building, and O. R. Johnson, Fenton Building, are architects.

John Wilkinson, Stewart F. Hancock, Hills Building, Syracuse, N. Y., and associates are negotiating for purchase of plant and business of Ames Iron Works, Oswego, N. Y., and will place plant in operation under new ownership.

Canadian Industries, Ltd., Montreal, has plans for new works at Cornwall, Ont., for manufacture of caustic soda, alkali-chlorine and kindred products, to include power house and machine shop. Cost about $1,000,000 with equipment. Robert Salmon is general manager of chemical division.

WASHINGTON DISTRICT

Prince George Brewing Co., Laurel, Md., Henry A. Seay, Union Trust Building, Washington, president, recently organized, has let general contract to J. Henry Miller, Inc., Eutaw and Franklin Streets, Baltimore, for new multi-story plant on site at Laurel, lately acquired. Cost over $400,000 with equipment. Leon Chatelain, Jr., 726 Jackson Place, N. W., Washington, is architect; James Posey, Baltimore Trust Building, Baltimore, is consulting engineer.

United States Coast Guard Headquarters, Washington, asks bids until March 13 for wire rope, size 6.

Board of District Commissioners, District Building, Washington, asks bids until March 15 for one motor-driven centrifugal pumping unit, 5,000,000-gal. per day capacity, for Anacostia pumping plant.

Mar-Dis Wines & Spirits Corpn., 104 Light Street, Baltimore, has leased five-story and basement building at 107 West Redwood Street, for new storage and distributing plant.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until March 14 for electric distribution system (Specification 7441), mechanical equipment and piping (Specification 7575), nine-panel remote switchboard, with switchgear, turbo-exciter and accessory equipment (Specification 7576), and improvements in power plant (Specification 7618) for Naval Academy, Annapolis, Md.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 13 for 36 pneumatic scaling hammers (Schedule 1874), one revolving electric crane truck (Schedule 1900-R) for Norfolk Navy Yard; air-driven boiler tube cleaning equipments (Schedule 1860) for Boston, Brooklyn, Philadelphia and Puget Sound navy yards.

WESTERN PENNA.

United States Engineer Office, Pittsburgh, plans new lock and dam No. 9 on Allegheny River, near Rimerton, Pa., about 60 miles north of Pittsburgh. Entire project to cost about $2,642,000.

Electro Metallurgical Co., 30 East Forty-second Street, New York, plans early completion of initial units of new plant at Alloy, near Clarksburg, W. Va., in course of construction for several months. Entire project will represent investment of over $2,000,000. Work is also under way on new hydroelectric generating plant on New River at Hawks Nest, W. Va., for power service at new Alloy plant, to cost close to $1,000,000 with transmission lines, etc.

Department of Property and Supplies, Court House, Pittsburgh, Robert G. Woodside, County controller, asks bids until March 13 for wire and electrical materials, overhead doors, etc.

SOUTHWEST

Monarch Metal Weather Strip Co., 5020 Penrose Street, St. Louis, has let general contract to John Hill Construction Co., Syndicate Trust Building, for new one-story plant, 120 x 180 ft. Cost about $45,000 with equipment. Clymonts & Heinicke, Wainwright Building, are architects. Company has sold present plant to Cupples-Hesse Envelope & Lithographing Co., 4173 Kingshighway, which will occupy for new paper converting works, continuing present factory as heretofore. Latter project will cost over $40,000 with equipment.

Common Council, Fredericktown, Mo., has plans for new municipal electric light and power plant. Application has been made for Federal aid for $132,525 for building and equipment. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Nelson Wine & Distilling Co., Springdale, Ark., recently organized by J. O. Nelson, head of Nelson Canning Co., Springdale, and associates, plans new multi-unit distillery and winery on 10-acre tract near canning plant, to include power house, machine shop and other buildings. Cost over $100,000 with equipment. Company is capitalized at $500,000. G. Love Grant, Fort Smith, Ark., is interested in new organization.

Common Council, Washington, Kan., is securing fund of $88,000 through Federal aid for new municipal electric light and power plant, using Diesel engine-generating unit. E. T. Archer & Co., New England Building, Kansas City, Mo., are architects.

Board of Education, Webster Groves, Mo., will take bids soon for new three-story and basement junior high school, to include manual training department. Cost $250,000. William B. Ittner, Inc., Continental Life Building, St. Louis, is architect.

Galveston Brewing Co., Galveston, Tex., recently organized, care of Martin H. Royston, 3312 F Street, representative, has acquired property at Thirty-third and Church Streets, and will remodel for new plant, with installation of brew-house, bottling and other machinery, conveyors, tanks, etc. Entire project will cost about $175,000 with machinery.

SOUTH ATLANTIC

Lombard Iron Works & Supply Co., Augusta, Ga., plans purchase of drilling machine for handling cylinder heads, turret lathe and multiple spindle tapping machine.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 13 for one crawler type tractor (Schedule 1875) for Pensacola, Fla., Navy Yard.

City Council, Columbia, S. C., Marshall Morton, city manager, plans extensions and improvements in municipal airport, including new hangar with reconditioning and repair shop. Fund of $37,000 has been arranged for work.

Farquhar Machinery Co., Jacksonville, Fla., is inquiring for quick change gear lathe, about 12-ft. bed.

Superintendent of Lighthouses, Key West, Fla., asks bids until March 21 for metal work for nine iron structures for Miami Harbor, Fla.

MICHIGAN DISTRICT

American Forging & Socket Co., Pontiac, Mich., has taken out a permit for one-story addition for stamping and plating. Cost about $25,000 with equipment.

Benton Harbor Brewing Co., Benton Harbor, Mich., has let general contract to Joel Pearson, Benton Harbor, for extensions and improvements. New equipment will be installed. Cost about $85,000 with machinery. M. F. Strauch, 3863 Lincoln Avenue, Chicago, is architect.

Metric Switch Laboratories, Inc., Detroit, has been organized by Stanley R. DuBrie, 1011 Van Dyke Avenue, and associates, to manufacture electric switches and parts and other electrical specialties.

Grand Rapids Metalcraft Corpn., Grand Rapids, Mich., manufacturer of automobile accessories and equipment, plans expansion, including addition of about 14,000 sq. ft. floor space. New equipment will be installed.

L. M. Schnagel, Monroe, Mich., is at head of project to erect local brewing plant. Initial unit will cost over $100,000 with equipment. Company will be organized to carry out project.

SOUTH CENTRAL

Tennessee Valley Authority, New Sprankle Building, Knoxville, Tenn., has arranged for purchase of 830 acres near Courtland, Ala., vicinity of proposed Gen. Joe Wheeler dam, Tennessee River, for site for construction camp, and plans machine and mechanical shops, saw and lumber mill, and other construction shops.

Buffalo Springs Distilling Co., Stamping Ground, Ky., has approved plans for new unit. Cost over $65,000 with equipment.

Louisville & Nashville Railroad Co., Louisville, plans one-story machine shop, 300 x 800 ft., to replace unit recently destroyed by fire. Cost over $60,000 with equipment.

City Council, Eminence, Ky., plans installation of pumping machinery and auxiliary equipment, filtration equipment, pipe lines, etc., for new municipal water system. Fund of

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PERFORATED METALS

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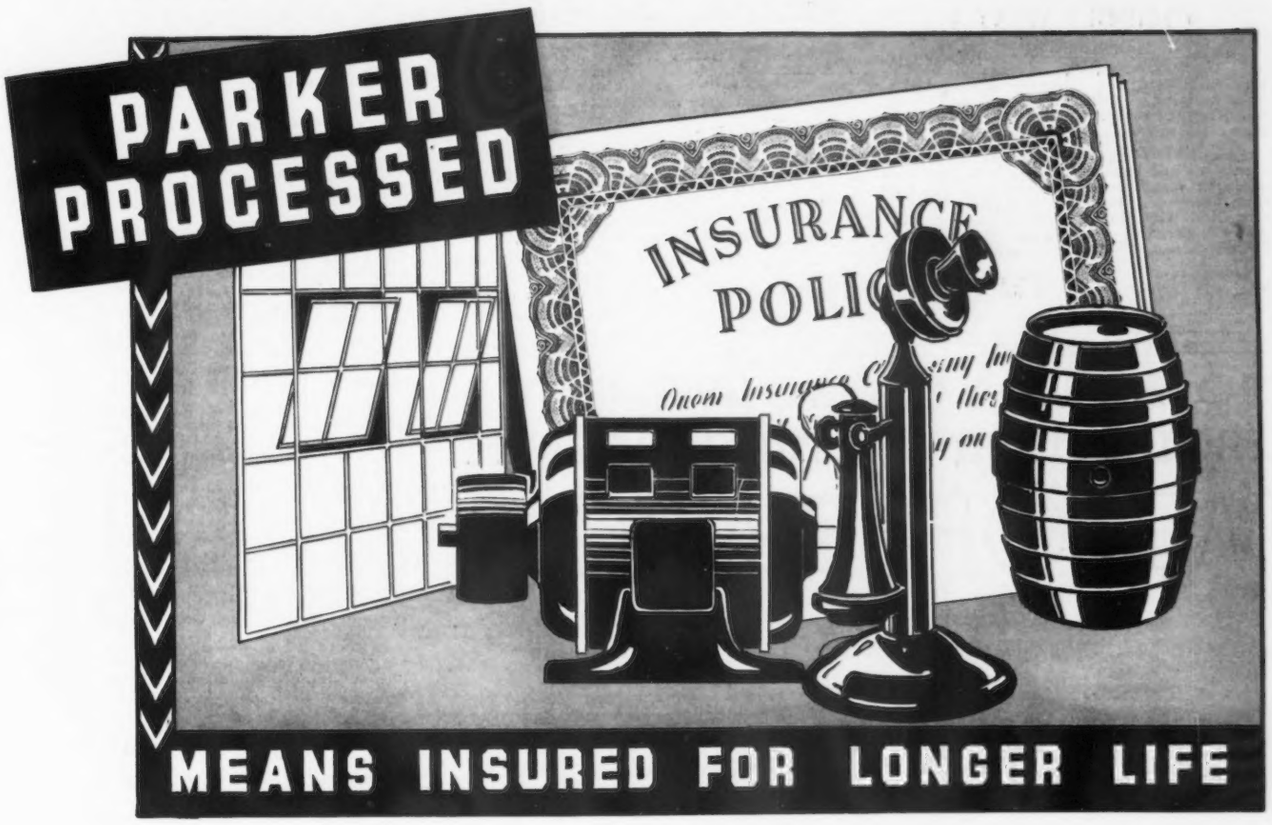

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$90,000 has been secured through Federal aid. J. S. Watkins, Lexington, Ky., is engineer.

Kentucky Richland Distilling Co., Carrollton, Ky., is considering new multi-unit plant. Cost over $100,000 with equipment. Ford, Bacon & Davis, Inc., 39 Broadway, New York, is consulting engineer.

MIDDLE WEST

Belmont Radio Corpn., 1257 Fullerton Avenue, Chicago, manufacturer of radio equipment, parts, etc., has leased five-story and basement building at Fullerton Avenue and Herndon Street, 36,000 sq. ft. floor space, beginning May 1 for new plant.

Schmick Brewery Co., Freeport, Ill., plans extensions and improvements in four-story and basement plant, to include new brewing, bottling, conveying, loading and other equipment. Cost over $150,000. Financing is being arranged. Fridstein Engineering Co., 228 North LaSalle Street, Chicago, is engineer.

Town Council, Gowrie, Iowa, asks bids until March 19 for new municipal electric light and power plant, including two Diesel engine-generating units and accessories, cooling tower, oil tanks, distribution lines, etc. Fund of $80,000 has been arranged. Young & Stanley, Muscatine, Iowa, are consulting engineers.

Minneapolis, St. Paul & Sault Ste. Marie Railroad Co., Minneapolis, plans rebuilding part of engine house, with reconditioning and repair facilities, at Fairmont, N. D., recently destroyed by fire. Loss over $65,000 with equipment.

Spartan Aircraft Motor Corpn., 123 West Broad Street, Sparta, Ill., has been organized by W. W. Lynn and R. C. Probasco, Sparta, and associates, to manufacture aircraft motors and parts.

Common Council, Winthrop, Minn., has authorized plans for new municipal electric light and power plant, for which fund of about $70,000 is being arranged. Bids will be asked for equipment early in spring. Ralph W. Richardson, New York Life Building, St. Paul, is consulting engineer.

Adolph Coors Co., Golden, Colo., has approved plans for new five-story brew-house, 60 x 100 ft., and four-story storage and distribution unit, 100 x 100 ft. Cost over $100,000 with equipment. John M. Gardner, 1345 Birch Street, Denver, is architect.

Schatzbrau Brewing Co., Melrose, Minn., recently reorganized, will soon resume erection of new three-story and basement plant, 80 x 180 ft., on which work has been held in abeyance for several weeks. A power plant will be built. Installation will include brewhouse, bottling, refrigerating and other equipment, copper kettles, conveyors, loaders, etc. Cost about $170,000 with equipment. L. F. Schafhausen, 2652 Bryant Avenue South, Minneapolis, is architect. Henry Otte is president.

Independent Concrete Pipe Co., 201 North West Street, Indianapolis, manufacturer of reinforced concrete pipe of large section, has approved plans for new branch plant at Lockport, Ill. Cost about $50,000 with equipment. E. J. Johnson is company engineer in charge.

Town Council, Wellman, Iowa, J. A. Dodds, town clerk, asks bids until March 12 for equipment for new municipal electric light and power plant, including two Diesel engine-generator units with auxiliary equipment, cooling and exhaust equipment, oil tanks, switchboard, etc.; also for complete electric distributing system. Fund of $85,000 has been secured through Federal aid. H. L. Cory, Redick Tower Building, Omaha, Neb., is consulting engineer.

Master Lock Co., 926 West Juneau Avenue, Milwaukee, manufacturer of laminated steel padlocks, has leased 16,000 sq. ft. additional floor-space and will purchase stamping presses and other equipment. Capitalization has been increased from $250,000 to $350,000 to handle growth of business. Philip E. Yolles is president.

City Council, Princeton, Wis., has authorized application for Federal loan and grant of $125,000 for construction of waterworks plant and sewerage system and disposal plant, designed by A. E. McMahon Engineering Co., Menasha, Wis. William Gore is mayor.

Northern States Power Co., LaCrosse, Wis., has been authorized to construct $50,000 power line, substations, etc., from LaCrosse to Genoa, Wis.

TO HELP YOU SOLVE YOUR PRODUCTION WELDING PROBLEM

WE OFFER YOU

- The accumulated experience of 50 years as pioneer and leading manufacturer of electric welding equipment. . . .
- The intimate knowledge of production welding as applied by Thomson-Gibb to the manufacture of hundreds of products ranging from coffee pots to grave vaults. . . .
- Complete information on the possibilities of production welding as applied to **your** product. Simply fill in and mail the coupon. There is no obligation.

THOMSON-GIBB ELECTRIC WELDING CO.

General Offices—Lynn, Massachusetts

Thomson-Gibb Electric Welding Company
162 Pleasant Street, Lynn, Mass.

Gentlemen:

☐ Please ask your nearest engineer to arrange for an appointment at our plant.

☐ Please *mail* (no personal follow-up) information on the welding of

Product _____

Metal _____

Approximate dimensions _____

Desired production per hour _____

Name _____

Company _____

Address _____

5994

PACIFIC COAST

Kingsland Granite Co., 602 Belmont Avenue, Fresno, Cal., plans new granite quarry and finishing plant on about 1100 acres at Bates Station, Madera County. Cost about $60,000 with quarrying, hoisting, conveying and other equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 13 for one crane hoist truck (Schedule 1839), three gasoline engine-driven trucks (Schedule 1841); until March 16, one motor-driven drill press (Schedule 1869), one motor-driven milling machine (Schedule 1870), one precision-type bench lathe (Schedule 1863-R), one motor-driven automatic screw machine (Schedule 1868-R), one lubricating oil reclaimer (Schedule 1864) for San Diego yard; until March 13, two switching locomotives, each 55-tons capacity (Schedule 1899-R), for Mare Island yard; until March 16, two motor-driven turret lathes (Schedule 1845) for Puget Sound yard.

Firestone Battery Co. of California, 2525 Firestone Boulevard, Los Angeles, manufacturer of electric storage batteries, has plans for one-story addition. Cost about $25,000 with equipment. Claud Beelman, Union Bank Building, is architect. Headquarters of company are at Akron, Ohio.

North Grant Union High School District, North Sacramento, Cal., plans manual training department in new two-story high school. Cost $165,000. Harry Devine, California State Life Building, Sacramento, is architect.

Santa Cruz Portland Cement Co., Crocker Building, San Francisco, plans new storage and distributing plant at Portland, on waterfront. Cost about $250,000 with equipment.

Schinner-Hofmann Brewing Co., 133 East First Street, Long Beach, Cal., recently organized, has opened offices at location noted and has plans for new plant on Long Beach Boulevard, including power house, machine shop and other mechanical departments. Cost about $150,000 with equipment.

Round Valley High School District, Covelo (Mendocino County), Cal., plans one-story vocational training shop at new multi-unit high school. Bids will soon be asked on general contract. Herbert & Caulkins, Rosenberg Building, Santa Rosa, Cal., are architects.

Contracting Officer, Fort Lewis, Wash., has let general contract to Howard S. Wright Co., Seattle, for one-story ordnance repair shop at $57,940, exclusive of equipment.

WEIGH the ADVANTAGES — *and* You'll Buy these SHEETS

USS STAINLESS STEEL

Sheets find a natural adaptability in many modern fabrications, whether from standpoints of utility and service, or of other outstanding advantages. The industrial, chemical, food handling, manufacturing automotive, architectural, and engineering fields furnish examples of such applications. No factors are overlooked to insure the best STAINLESS and Heat Resisting Steel Sheets that science coupled with long technical experience can produce. These are manufactured in a moderate range of compositions, and a number of finishes.

Our skilled technologists will gladly assist you in securing the particular type of STAINLESS Steel Sheets best suited for your needs.

SEND FOR THIS BOOK!

This Company manufactures high grade Stainless Alloy Steel Sheets for an extended list of purposes—also Black and Galvanized Sheets, Tin and Terne Plates Etc.

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Austenitic
USS 18-8
USS 18-12
USS 25-12

Descriptive literature and full information will be sent upon request.

USS Chromium-Nickel Alloy Steels are produced under licenses of the Chemical Foundation, Inc., New York; and of Fried. Krupp A.G. of Germany.

Chromium-Alloy Steels
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USS 12
USS 17
USS 27

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USS STAINLESS
AND HEAT RESISTING
STEEL SHEETS
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AMERICAN SHEET and TIN PLATE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

USS Stainless Steel Products also manufactured by following Subsidiary Companies of United States Steel Corporation:

AMERICAN STEEL & WIRE CO., Chicago — *Cold Rolled Strip and Wire Products*

ILLINOIS STEEL CO., Chicago, and CARNEGIE STEEL CO., Pittsburgh — *Bars, Plates, Special Sections and Semi-Finished Products*

NATIONAL TUBE COMPANY, Pittsburgh — *Pipe and Tubular Products*

◀ FOREIGN ▶

Ministry of Industry, Santiago, Chile, is inviting proposals up to May 15 for concession and Government aid for erection of a sheet glass plant with large capacity. Project will be carried out as feature of Federal industrial expansion law of country.

War Department, Canton, China, has authorized new arsenal under direction of Gen. Chen Chia Tang, military ruler of Canton and Kwantung Provinces. Fund of $21,000,000 has been authorized for plant, of which about $16,000,000 will be expended for machinery and equipment for gun and other firearm and military equipment manufacture.

Ministry of Industry, Government of Turkey, Istanbul, Turkey, plans new paper mill in Anatolia district for pulp-making and finished paper production, with power house, pumping plant, machine shop and auxiliary structures. Cost over $500,000 with machinery. Ministry is also planning development of sulphur mining properties near Smyrna, with mining machinery, conveying, loading and other mechanical-handling equipment.

Ministry of Transportation, Government of Poland, Warsaw, Poland, plans electrification of railroad from Cracow to Katowice, Zakpave and other points. Cost over $300,000 with equipment.

TRADE PUBLICATIONS

Pump Packing.—Aluminum Industries, Inc., Cincinnati. New catalog announcing a recently developed Permite water pump packing, particularly suited to automobile systems. The material features low cost, will not harden in service, and is not affected by any anti-freeze solution.

Driving Belts.—Gates Rubber Co., Denver, Colo. Folder describing the various applications and advantages of Vulco ropes. This material is molded with concave sidewalls, and has a wear-resisting bias-cut fabric cover.

Screws and Nails.—Parker-Kalon Corpn., New York. Illustrated catalog presenting complete information and technical data relating to the use of various types of screws and nails for all types of fastening problems.

Cold-Drawn Steel.—Union Drawn Steel Co., Massillon, Ohio. Folder giving the effect of cold drawing and annealing on properties of steel.

Cast Manganese Steel.—American Manganese Steel Co., Chicago. Bulletin describing the various industrial and machine applications of cast manganese Amsco alloy, which is particularly suited for parts encountering great wear or high temperatures. Characteristics of various types of Amsco welding rods are included.

Electric Melted Cast Iron.—Detroit Electric Furnace Co., Detroit. New booklet consisting of a compilation of extracts from trade magazines about the advantages of electric melting for securing high-strength cast iron.

Measuring Tools.—Van Keuren Co., Boston, Booklet containing information and data on precision measuring tools, including all types of gages, micrometers, laps, gage blocks and gear measuring wires.

Electric Controls.—Allen-Bradley Co., Milwaukee. Illustrated bulletin presenting an improved, compact, heavy-duty solenoid switch primarily designed for starting purposes.

Burner Equipment. — Surface Combustion Corpn., Toledo, Ohio. Bulletin describing savings effected and applications of improved gas-burning equipment for all types of new or reconditioned shop and industrial furnaces.

Electric Motors.—Louis Allis Co., Milwaukee. Large illustrated magazine showing developments in the field of a.c. and d.c. electric motors, as well as presenting complete data on the care and operation of motors.

Portable Carburizing Furnace.—W. S. Rockwell Co., New York. New catalog showing construction and advantages of Rockwell portable heat-treating and carburizing furnaces for annealing, hardening, etc. Heating is by electricity, gas, oil or coal.

Aluminum Paint.—Quigley Co., Inc., New York. Illustrated bulletin showing the advantages and characteristics of aluminum paint for plants and equipment. The product primes, protects and decorates the surface, and is highly penetrative and resistant to heat.

▲ TRADE NOTES ▲

Lockwood Greene Engineers, Inc., has moved New York office to 30 Rockefeller Plaza, and the Boston office to 40 Central Street.

George H. Grundy and Charles A. Lampard, 380 East Main Street, Stratford, Conn., have organized Grundy & Lampard to operate a commercial heat treating plant.

Otto Kafka, Inc., 2 Rector Street, New York, has been appointed export sales agent for the Central Iron & Steel Co., Harrisburg, Pa., and for Henry Disston & Sons, Inc., Philadelphia.

Allis-Chalmers Mfg. Co., Milwaukee, has moved its Buffalo district office to the Liberty Bank Building. A. D. Brown is district manager in charge.

Patterson Foundry & Machine Co., East Liverpool, Ohio, maker of pulverizing, grinding, mixing, clay-working and processing machinery, has opened an office at 406 Basso Building, 7338 Woodward Avenue, Detroit. Edwin L. Grimes has been appointed Detroit district manager. Louis H. Burkhart, Jr., is in charge of the western New York and western Pennsylvania territory with headquarters at Corry, Pa.

FINANCIAL NOTES

Marion Steam Shovel Co., Marion, Ohio, reports a net loss of $570,563 during 1933 after deducting all charges, including depreciation, interest on funded debt, and providing obsolescence reserves. The company's net loss during 1932 was $678,424. Its current assets Dec. 31 last year were $4,394,959 and current liabilities $292,582.

Chicago Flexible Shaft Co. has declared a quarterly dividend of 25c, payable March 30, to stockholders of record March 20. Three months ago a dividend of 25c plus the Federal tax then imposed on dividends was paid. Prior to that time no dividend had been paid since October, 1931.

Cutler-Hammer, Inc., Milwaukee, reports net loss for 1933 of $130,386, compared with $738,110 in 1932. Current assets Dec. 31, totaled $2,608,875 and current liabilities were $166,872. At the close of 1932, total current assets were $2,594,049 and liabilities $139,744.

J. I. Case Co., manufacturer of farm equipment, Racine, Wis., reports for 1933 a loss of $2,093,502 compared with a net loss of $2,611,081 in 1932. Sales showed a slight improvement over the preceding year, Mr. Clausen, president of the company, said, and collections improved during the summer months due to the improvement in farm prices.

Chain Belt Concentrates Operations at Milwaukee

THE Chain Belt Co., Milwaukee, Wis., has recently completed the transfer to Milwaukee of all of the manufacturing operations of its wholly owned subsidiary, the Stearns Conveyor Co., Cleveland. The last operation to be moved to the Milwaukee plant is the manufacture of the Rex-Stearns belt conveyor idlers.

The Chain Belt Co. acquired the Stearns Conveyor Co. by outright purchase of the capital stock in 1926. For several years the Cleveland plant was operated as a separate unit, but later the sales and engineering were merged with that of the conveyor division of the parent company in Milwaukee. At various times other operations have been consolidated with that of the parent company in Milwaukee and recently the Stearns plant has been confined to the manufacture of the Rex-Stearns belt conveyor idlers.

All of the gray iron, malleable iron and special metal foundries of the Chain Belt Co. are located in Milwaukee. This final transfer of the Stearns operation will therefore eliminate all of the inter-plant shipments that have previously been involved and will, of course, permit of consolidated shipments to the trade.

L. B. McKnight, formerly secretary and sales manager of the Stearns Conveyor Co., has, since the consolidation of the sales and engineering of the two companies in 1932, been manager of conveyor sales for the parent company. George M. Dyke, vice-president and operating manager of the Stearns Conveyor Co., formerly a member of the Chain Belt organization, will again be associated with the parent company in an executive capacity.

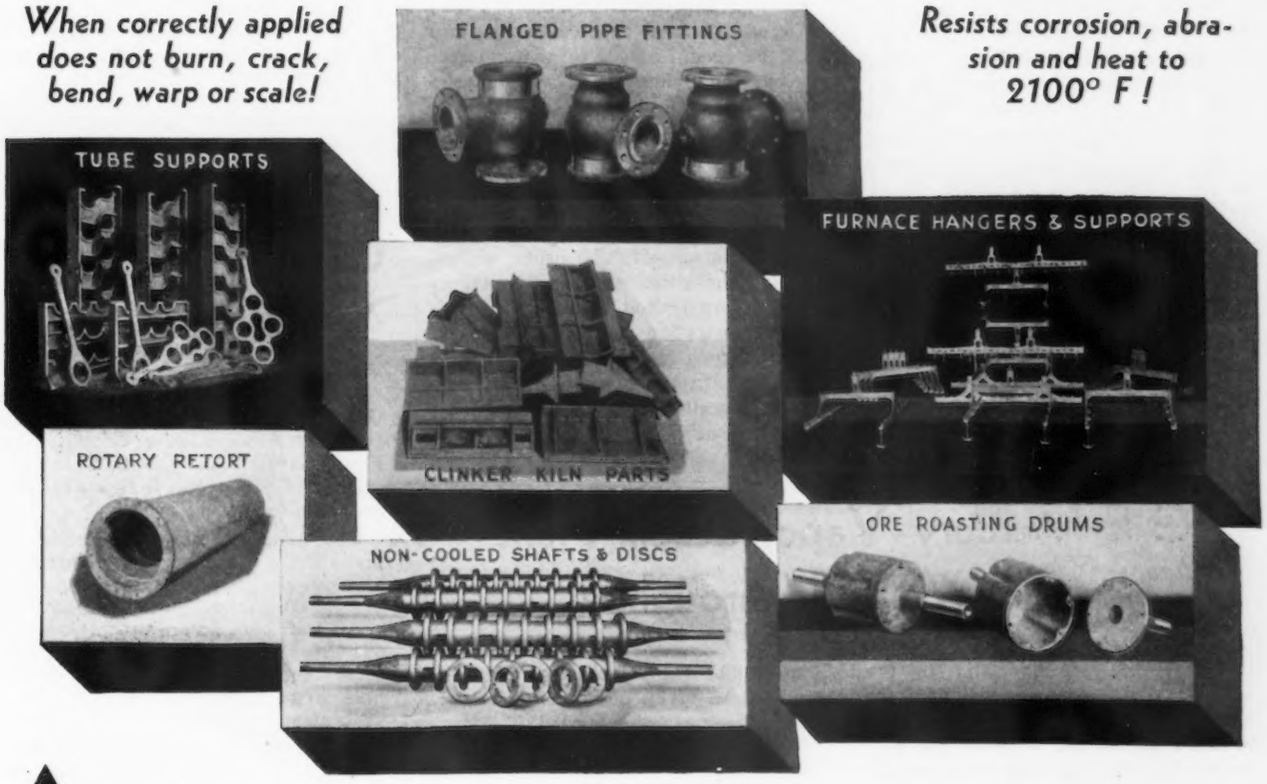
Sulphur dioxide removal from flue gases was discussed at a meeting of the American section of the Society of Chemical Industry at the Chemists' Club, New York, Feb. 16, by Prof. Donald B. Keyes, University of Illinois. The method that was finally worked out is to scrub the gases with a salt solution having a high solubility for the sulphur dioxide at low temperatures and a low solubility at higher temperatures. The sulphur dioxide is recovered as a liquid product.

An educational trip of Continental plants for student members of the Institute of Metals (Great Britain) will leave London April 8, returning April 14. The Cockerill and Ougrée-Marihaye steel plants, the Vielle-Montagne zinc works and the national munitions factory at Liege will be visited and the electrical manufacturing plant and the Providence steel works at Charleroi are included, with two days at Brussels and Bruges.

AMSCO ALLOY

When correctly applied does not burn, crack, bend, warp or scale!

Resists corrosion, abrasion and heat to 2100° F!



AMSCO ALLOY IS NOT NEW!

AMSCO ALLOY is an old, time-tested series of chromium-nickel and iron alloys now standardized in six different analyses and sold under this new trade name.

Eight years of making and applying AMSCO ALLOY to hundreds of industrial uses requiring complete heat, corrosion and abrasion resistance provide us with an unsurpassed knowledge of the demands made on and the results obtained from these alloys.

Applications of cast parts resisting the corrosive action of gases, acids and mine water, etc., are many. Heat resisting applications in furnaces, ovens, hearths, pots, boxes, etc., are innumerable. Abrasion resisting applications such as rolling mill guides are frequently met.

You, too, can profit by using cast parts of AMSCO ALLOY on equipment and in processes where you must combat the ravages of heat—corrosion—and abrasion.

Let our engineers help you in designing your parts so as to secure maximum life. Let our sales engineers show you how you can profitably apply them to your work. Specify AMSCO ALLOY on every cast part requiring complete heat—corrosion—and abrasion resistance.

Send for a copy of the new Bulletin—AMSCO ALLOY.

AMERICAN MANGANESE STEEL CO.,
375 EAST 14TH STREET
CHICAGO HEIGHTS, ILLINOIS.
Offices in Principal Cities.

AMSCO
TRADE MARK REGISTERED

Soviet Standardizes Blast Furnace Design

(*Concluded from Page* 24)

brick 40 mm. (1.6 in.) thick. The checker work is carried on cast-iron columns and grid plates.

The total heating surface per stove is 16,000 sq. m. (173,000 sq. ft.). The total weight of brickwork is 1700 tons. Block-type insulation 75 mm. (3 in.) thick with 90 mm. (3½ in.) over the dome is specified. The waste gas flue is located centrally under the stoves in the main foundation block. Seven stoves have a common stack 60 m. (197 ft.) high. Stove efficiencies of 85 per cent are anticipated.

Accessories for the standard stove include Freyn-Design pressure burners. The hot blast valve is 900 mm. (35½ in.) Freyn-Design gate type. It is operated by means of a small hand-winch. All fittings are at present arranged for hand operation, but may be readily adapted to ultimate automatic operation.

At all plants it is proposed to clean all of the gas. At Voroshiloff, Dzerjinsky, Zaporozhe and Azovstal Works, Theisen type disintegrators will be used. At all of these plants except Voroshiloff water will be quite plentiful. It is also proposed to use disintegrators at Tagil Works. The choice of disintegrators for the first furnaces built was dictated in a large measure by the fact that this method of cleaning is proven as to performance. At all of the other plants, now in the initial stages of construction, it is proposed to use the electrical precipitation method. Electrical precipitators are now being developed and built in the Soviet Union. The initial installations are being made at Tula and at Lipetsk plants.

G-E Mercury-Vapor Steam Plant Fusion-Welded Throughout

(*Concluded from Page* 11)

underside of the pipe and to the stands. The expansion joints were then anchored by welding. Fitted blocks were welded between the embedded H-section and the joint anchorage bases.

The 8-in. and 10-in. water pipe was handled in the same manner as outlined above except that the expansion joints were spaced 400 ft. apart. The expansion joints were fitted with anchorage members by the manufacturer but the anchorages on the bends were fabricated at the Schenectady works. The vertical risers, two of 28 ft. and one of 34 ft., were position welded with the W-20 heavily-coated electrodes.

Nine test specimens from tested welds were subjected to reduced-section tension tests, nick-break tests and bend tests. Specifications, covering in detail the entire welding procedure, were rigidly adhered to throughout the fabrication of these pipe lines. It is significant that not a single leak developed under steam test among the great number of roll welds and horizontal and vertical position welds.

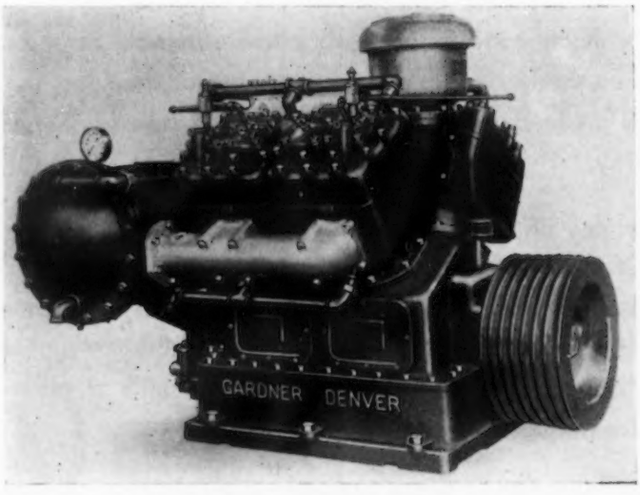
The electrodes used on the pipe and accessories amounted to 2155 lb. The welding cost was 3 per cent of the cost of the line exclusive of tunnel and bridge construction.

The intricate detail, erection difficulties and the magnitude of the work can best be appreciated by an inspection of the many pictures taken during the construction period.

Vertical Compressor Saves Floor Space

LOWER installation and maintenance costs as compared with horizontal compressors of the same capacity, and savings in floor space are claimed for new vertical air compressors recently brought out by the Gardner-Denver Co., Quincy, Ill.

Arrangement of the new machines may be seen in the illustration. Inlet and discharge valves are cushioned, and are silent. Large water jackets completely surround the cylinders and valves, assuring minimum cylinder temperatures. A water-cooled intercooler increases volumetric efficiency. Crankshafts are of forged steel and are supported by three bearings of bronze-backed, babbitt-lined, full-circle type. Pressure feed lubrication to all bearings is through drilled passages, an arrangement that eliminates oil pipes which are subject to breakage and leakage. A rotary oil pump supplies constant and uniform oil pressure.



Credit Manual of Commercial Laws

A COMPREHENSIVE legal digest containing a summary of commercial laws relating to credits, collections and sales, is in brief a description of the "Credit Manual of Commercial Laws," published by the National Association of Credit Men, 1 Park Avenue, New York. The 1934 edition, of 512 pages, is now available and sells for $4.

The manual essays a detailed explanation of the rights, obligations and safeguards of creditors and debtors in all States. It is arranged in text book form according to the various steps in commercial transactions from the receipt of an order to its final disposition, including such important steps as checking the buyer's responsibility and collection methods.

During the past year a total of 144 State legislatures passed laws affecting commercial transactions. These laws have all been checked and revisions made in the 1934 text to provide the business or credit executive with valuable information on various legal aspects of his daily work.

The production of babbitt metal in January of this year totaled 2,256,-109 lb., compared with 1,346,030 lb. in January of last year, according to the Bureau of the Census.

And before you do, *see* General Electric

If

If you want a single-operator welding set, insist upon performance—choose a G-E welder for bare as well as heavily coated electrodes.

You'll find everything you demand in a good welding set—flexibility, pep, arc stability, easy operation, and thorough reliability—in the G-E Type WD welder.

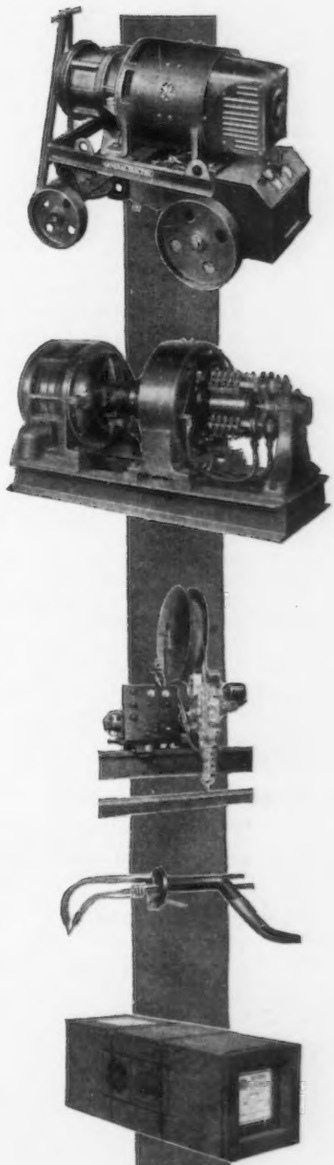
If you have a large welding shop, you'll find a G-E multiple-operator set well worth investigation.

G-E multiple-operator sets are *central stations* for welding power from which as many as fifteen operators can weld simultaneously—and more conveniently and economically.

If you require high-speed, uniform welds, there's a G-E automatic head and handling equipment; also a new automatic head for feeding heavily coated electrodes.

If it's a difficult welding problem involving thin metals or special alloys, or requiring extremely high-quality welds, a G-E atomic-hydrogen welding equipment, either manual or automatic, is the answer.

If it's a pound or a carload, there's welding dependability in every G-E coated electrode, from the lightly coated automatic wire to the heavily coated electrode for vertical and overhead welding. And cable, helmets, and other accessories, too.



Every welding need—on one order blank—from one manufacturer.
See your nearest G-E distributor or G-E office. General Electric, Schenectady, N. Y.

140-4

ELECTRIC

JUST BETWEEN US TWO

It Bounced Back

LIKE most upper class jails, a certain famous penitentiary takes The Iron Age. We have always spoken well of penal institutions, thinking we might some day be a customer, owing to our habit of overdrawing our checking account, which in these days overdraws very easily.

We used to be nonchalant about it, until we heard that issuing rubber checks is a criminal offense. But maybe we heard wrong, for when we deposited the check just received from this certain famous penitentiary, paying its subscription, the bank returned it with a note, *"No funds available."*

You can't scare a jailer by saying, "We'll put you in jail," so we'll just have to sit tight and hope the jail business shares in the general upturn.

More Solid Than Rock

WE just can't picture Bruce Barton presenting one of Thorstein Veblen's books to a big prospective advertising client he was hoping to warm up. Yet a statement of Veblen's is the very viscera of the case for advertising. This is it:

> *"The substantial foundation of the industrial corporation is its immaterial assets."*

Immaterial assets are largely goodwill. Goodwill's father, mother and greatuncle are advertising. If your factory burns down, you can replace it, but if your goodwill burns up . . . .

Fat's in the Fire

AS you will observe from the emaciated appearance of this and other family journals, many erstwhile generous advertisers have been living on their fat for quite a while. Some are getting a little scared and are shooting the works with a sixteenth page ad. once a month.

Which reminds us of a story Senator LaFollette tells. A boy who joined the army promised his mother he would stay out of the aviation corps, but the urge was too strong. When he wrote home, his mother replied:

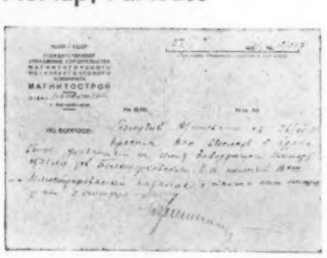
> *"Dear Son: I am sorry you disobeyed me. But I want you to promise me one thing. Never fly fast and always stay close to the ground."*

Staying close to the ground is going to raise cain (this particular family journal has an ironbound rule against the use of the word hell) with the immaterial assets of some people we know.

Blurb of the Week

THIS week, gentle reader, we impart the gladsome news that the little, leap yearless month of February, just past, outranked all other Februarys back to 1927 in number of new subscribers. As if you cared.

Hel-lup, Pul-lease



IT cost us eighty cents to find out that E. P. Belocerkovski, Manager of Import Dept., State Directorate of the Magnitogorsk Metallurgical Combine, U.S.S.R., writes, *"Received your letter of Dec. 26 and request you to send us your complete illustrated catalogue and also, if possible, two calendars."*

Now, we didn't write to Mr. Belocerkovski and think the letter is intended for one of our advertisers. If you are guilty, we'll send it to you.

Incidentally, did you notice in Printers' Ink that *"the technical staff of any Soviet industrial enterprise originates the requisitions and draws up the specifications for equipment needed there."* And is The Iron Age the apple of the eye of U.S.S.R. plants making metals and metal products!

Such Fun

WHEN is some smart Iron Age advertiser who wants to do business with Russian industry going to have a part of one of his ads set in Russian? Of course, they read English, but, ah, the novelty of it! And think what fun our typesetters will have playing with Russian type that looks the same upset down, right-side foremost, and backwards.—A.H.D.

Cone 4-Spindle Automatics

Are economical and accurate producers of screw machine parts up to 6" diameter 7" milling length. They cut costs, increase production, boost profits.

Write for particulars

CONE AUTOMATIC MACHINE CO., Inc.
WINDSOR, VERMONT

REPRESENTATIVES:

Detroit: J. C. Austerberry's Sons, 634 E. Congress St., Detroit, Mich.
Chicago: John H. Glover, 2127 North Sayre Ave., Chicago, Ill.
Ohio: S. B. Martin, 1077 Erie Cliff Drive, Lakewood, Ohio.
New England: Potter & Johnson Machine Co., Pawtucket, R. I.
Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.
New York State: Syracuse Supply Co., Syracuse, N. Y., also Rochester, N. Y.
Pennsylvania: Arch Machinery Co., 1005 Park Bldg., Pittsburgh, Pa.
Philadelphia: Lloyd & Arms, Inc., 133 South 36th St., Philadelphia, Pa.
California: C. F. Bulotti Machinery Co., 829-831 Folsom St., San Francisco, Calif.

ABRASIVE SURFACE GRINDER

Either Horizontal or Vertical Spindle Type
Countershaft or Motor Drive

Get our bulletin for particulars

ABRASIVE MACHINE TOOL CO., East Providence, R. I.

STAMPINGS · DIES · TOOLS

Quotations Cheerfully Given
WILEY & LETT, INC.
Wi-Le Products
MARION, IND.
Stampings Developed and Assembled
JIGS FIXTURES

WILEY & LETT, INC., Marion, Ind.

H & G DIE HEAD

CUT THREADS BETTER QUICKER CHEAPER

Sizes and Styles for All Machines
THE EASTERN MACHINE SCREW CORP.
21-41 Barclay St., New Haven, Conn.
Pacific Coast Representatives:
Los Angeles, A. C. Behringer, 312-316 Commercial St., Los Angeles, Cal.
San Francisco, A. H. Coates Co., 1142 Howard St., San Francisco, Cal.

LELAND-GIFFORD COMPANY
Worcester, Mass.
Drilling Machinery
Belt and Motor Spindle
One to Six Spindles
Tapping Attachments and Multiple Heads

Cutting Off Machines for Sawing All Kinds of Metals

THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE. PHILADELPHIA, PENNA.

THE CLEVELAND STEEL TOOL CO.
Punches. Dies. Chisels. Rivet Sets
660 E. 82nd St. Cleveland, O.
If it's RIVETED you KNOW it's safe